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ENERGY REGULATORS REGIONAL ASSOCIATION

Licensing/Competition Committee

ISSUE PAPERS

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Licensing/Competition Committee
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Dear Colleagues:

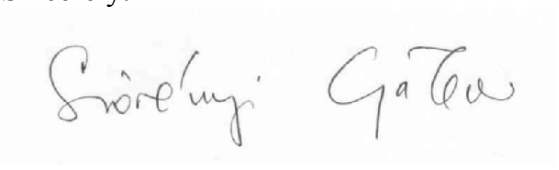
I am honoured to present to you a new set of issue papers and discussion papers, the products of our joint work and efforts during 2002 and 2003. With the new schedule of the ERRA Annual and Committee Meetings, these papers are submitted to the 7th Annual Energy Regulatory Conference for Central/Eastern Europe and Eurasia.

According to the agreement of all Licensing/Competition Committee Members, the focus of our work has been shifted from issue papers to discussion papers and case studies. Discussion papers and case studies provide a good opportunity for teamwork and for the systematic assessment of the given issue. They also imply more active involvement of committee members both in terms of data collection and data processing. Over the past year, more emphasis has been put on the information and experience transfer between ERRA member regulators. The attached papers are excellent examples for this new activity.

Among the enclosed five papers there is only one issue paper: "*Cross Border Capacity Allocation Methods*". The paper examines various issues related to the measurement and allocation of available transmission capacities and the challenges confronting the energy regulators of the ERRA region. In its appendix, the paper provides for a glossary of terms related to cross border capacity allocations methods. The Discussion Paper "*Dispute Resolution"* outlines the mechanisms and categories of dispute resolution for the member regulatory offices of the ERRA. The third paper is a Case Study prepared by the Kazakh Regulator on the "*Negative Experience of the Kazakh Regulator in Working with Subjects of Natural Monopolies in the Area of Leasing and Concession*". Next we present the "*ERRA Market Models*" that identifies the broad categories within which each aspect of each ERRA member's market fits, and associates potentially useful regulatory policies with each category. Regulators in these emerging markets will have ready access to a catalog of tools. Finally, you will find enclosed a Discussion Paper prepared by the "*Benchmarking/Monitoring*" Working Group. The provides comparative information about the technical infrastructure, pricing and regulatory principles involved in electricity transmission and distribution of some ERRA member countries.

I would like to congratulate to all of you for the attached set of papers. They prove your enthusiasm and your dedication to study regulatory practises existing in the ERRA region. At the same time, I would like to thank the continuous technical support received from the National Association of Regulatory Utility Commissioners (NARUC), U.S. Agency for International Development (USAID), and the Council of European Energy Regulators (CEER). I look forward to our continued successful work in the next years.

Sincerely:



Dr. Gabor Szorenyi
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Director, Hungarian Energy Office

CROSS-BORDER CAPACITY ALLOCATION METHODS

Issue Paper
ERRA Licensing/Competition Committee
February 2003

1 Introduction

To create a liberalized electricity market with effective competition among producers of electricity (including base load, cycling or load-following, and peak) and among purchasers (including independent suppliers and qualified customers) it is necessary to have a reasonable number of buyers and sellers. In countries where there is not enough competition among domestic producers, it is necessary to consider a market structure in which domestic producers compete with imports to serve the domestic market.[1] Qualified customers, public suppliers, and independent suppliers should be able to choose between domestic producers and foreign producers (or foreign suppliers) when they negotiate supply agreements. In countries where there is a surplus of generating capacity relative to domestic requirements, it is necessary to consider a market structure in which domestic producers export energy to other countries on a competitive basis. No producer or supplier should be given a special preference when cross-border capacity is used to export energy.
One of the constraints on the level of imports or exports is the amount of available transmission capacity on the interconnections with other countries in the regional electricity market. The measurement and allocation of available transmission capacity is an important issue in the European electricity market, where transmission "bottlenecks" exist on the Italian border and the France-Spain border. It could become an important issue regarding electricity trade among countries in Eastern Europe and Eurasia. For example there is some evidence that a bottleneck exists on the Hungarian-Slovak border.
The introduction of capacity allocation methods will help fulfil the Energy Charter Treaty. Governments that have signed the Energy Charter Treaty have an obligation to ensure that their methods of allocating cross-border transmission capacity do not restrict imports (for example, by protecting domestic producers from competition with imports) and do not restrict exports. It is not clear how this legal principle would actually be enforced, but a dispute over cross-border transmission capacity could be managed under the Energy Charter Treaty process, which is related to the General Agreement on Tariffs and Trade (GATT). Trading rules for import and export should be non-discriminatory:

> A further important obligation under GATT is the prohibition of quantitative restrictions on imports and exports of electricity. This means that governments may not use policy instruments to regulate imports or exports other than customs duties. For electricity trade, these provisions – contained in GATT Article XI – have major implications: once traditional monopolies or other exclusive rightholders disappear and consumers with trade rights (eligible customers) emerge, governments are not entitled to introduce non-tariff measures to replace trade barriers implicitly applied by former vertically integrated monopolies. The combined application of GATT Articles III and XI implies that any internal liberalization measure affecting

[1] Competition will be inadequate if one producer controls a large share (for example 70 percent) of the installed capacity of generating units used for low-cost base load, or the generating units used for load following, or the generating units used for peaking and reserve capacity.

electricity trade should *ipso facto* be extended to the importing of foreign electricity.[2]

The purpose of this paper is to provide the members of the ERRA Licensing/Competition Committee with a simple introductory guide to the measurement and allocation of cross-border transmission capacity, with a focus on (a) regulatory issues that fall within the jurisdiction of most ERRA members, and (b) capacity allocation methods that have been demonstrated to work effectively in European countries.

2 Definition of Network Congestion

The question of how to allocate transmission capacity is not really an issue unless there is a shortage of transmission capacity, relative to the implicit or explicit requests for transmission service that are given to the *transmission system operator* (TSO) or to the *independent system operator* (ISO). However, power system specialists do not speak of "capacity shortages;" they speak of *congestion* or *bottlenecks* when describing a situation in which the infrastructure does not meet the needs of the marketplace.

Network congestion is a little bit like traffic congestion: it is the appearance of a network condition, in certain places at certain times of the day, in which the infrastructure does not have enough capacity - for example, a condition in which the main boulevards and streets do not have enough lanes permitting traffic flow in a certain direction, at rush hour. Congestion does not develop only on main boulevards, it can also develop on small streets in the city center. Similarly it is not only an issue for Extra High Voltage and High Voltage networks, it can be a problem in Medium Voltage networks, and in any case the separation between "transmission" and "distribution" networks varies according to national legislation. In the European Union there is a debate over *transmission congestion*, but this is merely the international component of *network congestion*. Although different rules may be used to manage cross-border congestion and internal congestion, and different rules may be used to manage transmission congestion and distribution congestion, the basic problem is essentially the same and therefore the definition of congestion should be the same.

Like urban transportation infrastructure in Eastern Europe and Eurasia, electricity transmission infrastructure has had little new construction since 1990 but the pattern of load flows has changed. Since 1990 several changes in the electric sector of Europe and Eurasia have affected load flows. Regions that were once synchronous are now divided . On the high voltage lines crossing the western border of Ukraine, and in the high voltage networks of Bosnia and Herzegovina, power flows have changed dramatically as a result of east/west separation of networks. Moreover, energy from power stations that were once "affordable" has become relatively expensive. In many countries the use of oil- and gas-fired units has decreased since 1990 because the cost of imported oil and gas has increased relative to the cost of nuclear fuel and domestically produced coal.[3] In countries where power stations have not received enough revenue to pay for needed repairs, producers have been forced to take generating units out of service. All of these conditions create changes in load flows that would probably lead to transmission congestion, if peak load today were above the 1990 level.

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[2] Energy Charter Secretariat, *Regional Electricity Markets in the ECT Area*, 3 October 2002, Section 7.1, page 31. Posted at www.encharter.org at the page for the Electricity Seminar, Brussels, 3 October 2002.

[3] Gas-fired units are needed for environmental reasons. If the location of new gas-fired units is different from the location of older coal- or oil-fired units, congestion might result.

On the other hand, the high voltage electric networks of Eastern Europe and Eurasia were designed to meet the annual generation requirements and peak loads of 1990-1991 which in many countries are higher than 2001-2002. In some countries domestic producers are protected from competition with imports and therefore the level of imports in 2002 is below the 1990-1991 level. Therefore in many countries and at many border crossings there is "excess" transmission capacity, and dispatchers do not consider transmission congestion a problem. This situation could change in the next few years, so congestion could become a problem.

The simplest indicator of congestion is a situation in which a power station is able to offer energy at a competitive price but is unable to sell it because the grid cannot transmit the energy to the customers who want to buy it. There is no official definition of *transmission congestion*. The June 2001 Activity Report of the French electricity regulator contains the following definition:

> Congestion. A line condition that prevents grid requirements from being satisfied (i.e. all transactions to be completed), because of grid equipment characteristics and performance. [4]

In March 2001 the European Commission included a definition of congestion in its proposed Regulation on cross-border electricity trade:

> "Congestion" means a situation in which an interconnection linking national transmission networks cannot accommodate all transactions resulting from international trade by market operators, due to a lack of capacity.[5]

This is fairly clear and simple, although the concept of "lack of capacity" is technically imprecise. However the European Transmission System Operators Association (ETSO) in September 2001 proposed a very different wording:

> A "congestion" exists when operational security criteria cannot be satisfied as a result of the load flow on the network under consideration. A congestion is also defined if a TSO has well founded grounds that operational security criteria cannot be satisfied if all registered or forecasted load schedules are accepted. Congestions are defined for imports into a control area or a group of control areas, for exports from a control area or a group of control areas, or for Transits.[6]

Part of the problem is that *transmission congestion* is an imprecise description of the state of the network and it does not describe a certain event, such as the collapse of a transmission tower, that occurs in a particular place at a particular time. It is related to one or more *constraints*, which may be represented graphically in different ways.[7] It is not a problem that can be resolved by reinforcing the transmission network at border crossing points only. It conveys an implication (which is true) that some customers are forced to pay a higher price for electricity as result of network constraints, but none of these definitions mentions the effect of the constraint(s) on prices.

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[4] Commission de Régulation de l'Électricité, *Activity Report 2001*, page 44. Published at www.cre.fr .

[5] European Commission, *Proposal for a Regulation of the Parliament and of the European Council on Conditions for Access to the Network for Cross-Border Exchanges of Electricity*, Brussels, 13 March 2001, Article 2. Published at http://www.europa.eu.int/comm/energy/en/internal-market/int-market.html .

[6] *ETSO Position on the Commission's Proposal for a Regulation of the European Parliament and of the Council on Conditions for Access to the Network for Cross-Border Exchanges in Electricity*, 20 September 2001, page 3. Published at http://www.etso-net.org under "Public Documents: Position Papers."

[7] ETSO, *Key Concepts and Definitions for Transmission Access Products*, April 2001, pages 5 to 9. Published at http://www.etso-net.org under "Public Documents: Proposals/Reports."

In the last two years it has been common to speak of *critical bottlenecks* in the European high voltage network. From a regulatory standpoint this is a more useful concept because the idea is that a bottleneck becomes "critical" when it significantly increases electricity prices on the high-price side of the bottleneck, relative to the price level that would result if the bottleneck were eliminated. However there is no precise definition of a critical bottleneck. An excellent study of bottlenecks was completed for the European Commission in December 2001 by an expert team based in Aachen, Germany.[8] The Italian border (with all neighbor countries) and the French-Spanish border were shown to be the most serious bottlenecks because they have the greatest effect on electricity prices.

When two systems are not interconnected, the first step in electricity trade is to interconnect them. There is no congestion until there is first an interconnection. Where possible, the method of allocating transmission capacity should be selected before a new interconnector is built. Within the "expanded" European Union in 2004, for example, some degree of regulated third-party access will be required on all interconnectors, and it would be a mistake to think that one or two investors will be permitted to earn monopoly profits by becoming owners of a particular interconnector. These issues should be considered by the energy regulatory authorities before the investment is made.

3 Definition of Net Transfer Capacity

In any country the *capacity* of each generating unit of each power station is known to the national dispatch center. On a daily basis the dispatch center monitors the *available capacity* or *working capacity* precisely and the dispatcher knows how many minutes or hours are needed to make capacity available from each generating unit. The potential output of a hydro station is measured by energy in MWh as well as capacity in kW. It is important to know how long a given level of MW output can be maintained, but hydro reservoir levels, river flow, and other factors constraining MW output are easy to measure.

Cross-border transmission capacity is something different; it reflects the state of the network and it not easy to understand. It is complex and three-dimensional, because it varies over time. A two-dimensional diagram with a time stamp gives us only a snapshot of a dynamic process.[9] The starting point for a discussion of the amount of transmission capacity available to implement electricity market transactions is the definition of Net Transfer Capacity (NTC):

> At the interface between two interconnected transmission systems A and B, *Net Transfer Capacity* is estimated for direction A-B and for direction B-A. NTC equals Total Transfer Capacity, less Transmission Reliability Margin, in one direction, measured in MW. NTC is the expected maximum value of generation that can be wheeled through the interface between the two systems, which does not lead to network constraints in either system, respecting some technical uncertainties on future network conditions.[10]

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[8] Institute of Power Systems and Power Economics of Aachen University of Technology and CONSENTEC, *Analysis of Electricity Network Capacities and Identification of Congestion*, report to European Commission, December 2001. Published at http://www.europa.eu.int/comm/energy/en/elec_single_market/index_en.html .

[9] If we imagine load flows at different voltage levels ranked from "highest" to "lowest" then the concept of transmission capacity varying over time can become four-dimensional. The most important cross-border power flows are at the highest voltage levels (for example 400 kV and 220 kV).

[10] See ETSO, *Net Transfer Capacities (NTC) and Available Transfer Capacities (ATC) in the Internal market of Electricity in Europe (IEM): Information for User*, March 2000. Published at http://www.etso-net.org

Clearly NTC requires an analysis of "constraints" and "uncertainties" and it is not a simple measure, like the nameplate rating of a turbine generator. The "interface between two interconnected systems" is not necessarily a national border; it could also be the interface between two TSOs within a country such as Germany, Austria, or Switzerland. The time period for measurement of the "expected maximum value" is not necessarily defined as "summer" or "winter;" it could be a day, a week, a month, or a quarter.

Although ETSO publishes "indicative values" for Net Transfer Capacity (NTC) for each summer and each winter, it would be a mistake to assume that electric transmission capacity at any border between two countries is a firm, fixed number. The NTC figures are very carefully explained in ETSO technical publications.[11] These are not necessarily the figures that would be used by two neighboring TSOs in a daily auction or daily allocation procedure. The December 2001 analysis of network capacities and congestion, funded by the European Commission, made the following observation:

> The NTC values published by ETSO are the result of a common effort of the European TSOs to provide indicative figures on the general development of interconnection capacity. For a number of reasons, e.g.
>
> - long time horizon,
> - neglecting of actual parallel flow situation,
> - ambiguity of underlying assumptions on the base case exchange …
> - computation and data negotiation effort, and
> - mismatch between common ETSO capacity definitions and individual national rules,
>
> the usability of these values for actual allocation of cross-border capacity to network users may be questioned.[12]

Cross-border transfer capacity may be viewed as a combination of "guaranteed" and "non-guaranteed," or firm and non-firm, capacity. There is a question, not yet resolved at the European level, whether non-firm transfer capacity should be offered to the marketplace at all. In effect the question is whether non-firm transfer capacity is really worth anything. It is something like non-firm hydro generation but it is not generation – it is only transfer capacity at the interface between two TSOs, or at a national border. The French grid operator RTE offers non-firm transfer capacity, with approval of the French regulatory authority:

> Most European transmission grid managers establish a reference Net Transfer Capacity (*NTC*) and then spread out any re-dispatching costs from sporadic congestion mutually among all their users, in the final prices they apply. Once all the capacity has been allocated, no further throughput is accepted. RTE, though, allocates capacity over and above the capacity it posts, but without guarantee. It is

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under "Public Documents: Relevant Market Information." The definition given here is not a precise quotation from the ETSO report, but a summary of several statements made in this ETSO report.

[11] The least technical explanation is contained in ETSO, *Net Transfer Capacities (NTC) and Available Transfer Capacities (ATC) in the Internal market of Electricity in Europe (IEM): Information for User*, March 2000. Transmission capacity concepts are defined more precisely in ETSO, *Definitions of Transfer Capacities in Liberalized Electricity Markets*, April 2001. Published at http://www.etso-net.org under "Public Documents: Proposals/Reports." See also ETSO, *Procedures for Cross-Border Transmission Capacity Assessments, October 2001*. Published under "Public Documents: Relevant Market Information."

[12] Institute of Power Systems and Power Economics of Aachen University of Technology and CONSENTEC, *Analysis of Electricity Network Capacities and Identification of Congestion*, report to European Commission, December 2001, page 29.

up to the user to measure the risk of using this capacity that is not guaranteed, and the risk is certainly higher than if it is. This approach has the advantage not clamping any prior limit on the capacity that can be allocated at the interconnections and it is in line with the objective of creating a more fluid and more competitive electricity market.[13]

Arguably the *combination* of non-firm hydro generation plus non-firm transfer capacity might be worth something. The suppliers or qualified customers who purchase non-firm hydroelectric energy should be prepared to accept an additional source of non-firmness. Normally in an international electricity exchange, buyers purchase hydro generation on a day-ahead basis and that generation is "firm" from the buyer's point of view. Although the buyers and sellers in intradaily markets (such as El-Ex Exchange in Finland) may feel that non-firm transfer capacity is worth something, most intradaily markets do not cross national borders.[14]

4 Challenges Confronting the Energy Regulator

Because the definition of *transmission congestion* is somewhat controversial and because the measurement of Net Transfer Capacity involves "constraints" and "uncertainties" that are difficult to define, the reader may feel that the whole subject of transmission capacity allocation is an arcane topic like astrophysics, in which the experts are going to tell us that our understanding is incomplete and inaccurate whenever we try to explain the topic in clear and simple terms. From the viewpoint of an energy regulatory authority, the topic of transmission capacity allocation has to be frustrating. There are dozens, if not hundreds, of technical papers on the Internet explaining how the EU countries are trying to resolve their transmission congestion problems and suggesting theoretical approaches to the resolution of these problems. What should a Regulator do? Should the Regulator simply tell the TSO to pursue some laudable objective, such as "transparent and non-discriminatory access to the network," without asking any questions about transmission congestion?

Because the issue is somewhat technical, the answer to this question is probably not going to come from the Parliament or the Cabinet of Ministers. Rather, the answer depends on (a) the objectives the Regulator seeks to achieve and (b) the resources available to the Regulator, to meet those objectives. There are at least seven possible objectives to be considered, with regard to transmission congestion. The Regulator may try to set regulatory policies which would stimulate market participants to:

(1) Reduce the importance of national borders as constraints on the electricity market, with the goal of increasing competition among producers and among suppliers
(2) Promote and encourage investments in the transmission network needed to fix critical bottlenecks and thereby lower electricity prices to consumers
(3) Promote and encourage investments in the transmission network needed to diversify electricity supply sources and thereby increase national energy security
(4) Monitor transmission congestion, using market mechanisms and price signals instead of rationing, first-come-first-serve, or curtailment
(5) Establish a system of inter-TSO payments so that each TSO or ISO will be compensated fairly for the transmission services it provides in a regional electricity market

[13] Commission de Régulation de l'Électricité, *Activity Report 2001*, pages 11-12. Published at www.cre.fr .

[14] Intradaily markets provide an opportunity to trade MW two or three hours ahead of real time.

(6) Implement a vision of a regional electricity market, based on the wording of agreements negotiated among political leaders at the highest level
(7) Ensure the stability of the high voltage network in a liberalized regional electricity market with independent suppliers and with many participants.
(8) Cooperate closely with the System Operator to prepare rules for allocating cross-border capacity

Within the region defined as the EU plus Norway plus Switzerland, objectives (4) through (6) are of great interest to Regulators and to the Council of European Energy Regulators (CEER). Objective (7) becomes a consideration for the Regulators when the proposed reforms based on (4) through (6) are considered too ambitious from the perspective of UCTE, Nordel, and other TSO associations. A few governments such as Norway are interested in (3) and in those countries the Regulator must take (3) into consideration.

5 Basic Methods of Allocating Net Transfer Capacity

For ERRA members, the most useful introduction to methods of allocating Net Transfer Capacity (see Appendix A for a definition of NTC) is an ETSO publication issued in November 1999.[15] Compared with other ETSO reports, this one has the advantage that it focuses on practical methods that can be implemented in the short term or have already been demonstrated in the region covered by the EU plus Norway and Switzerland. The following methods were evaluated in the November 1999 report:

(1) Curtailment based on first come, first served. TSOs within a region establish a coordinated schedule for allocating NTC among bilateral agreements on a regular basis (daily, weekly, or monthly). For example the TSOs could publish a notice saying that all parties wishing to use NTC during the month of February should submit their requests for transfer capacity in MW, on or after 0800 on January 15 and before 0800 on January 31. Each "contract flow" request could be defined as country-to-country, zone-to-zone, or point-to-point, but the TSOs would need to forecast physical flows, which may cross many national borders. For each interface the TSOs would accept "contract flow" requests until NTC is fully committed in both directions. Obviously when NTC in the direction A-B is fully committed, the TSOs may continue to accept requests in the direction B-A and possibly some additional transfer capacity in the direction A-B will be made available. This method is consistent with the assumption that the users who really need transfer capacity will be the first to request it, and the "last minute" requests are not so important. This method is not effective if a power exchange is operating in one of the countries.
(2) Curtailment based on ranking according to power market bids. The simplest example would be an interface between country A where a power exchange is located and country B where there is no exchange. The buyers and sellers in country B who submit bids to the power exchange in country A need access to the transfer capacity between the countries, so the priority rule is as follows:

    For sales from B, the highest priority is for the lower bid price
    For purchases from B, the highest priority is for the highest price

[15] ETSO, *Evaluation of Congestion Management Methods for Cross-border Transmission,* November 1999. Published at www.etso-net.org under "Public Documents: Proposals/Reports."

In other words the power exchange in A wants to import electricity at the lowest possible price and export electricity at the highest possible price. It is permitted to do so. Buyers and sellers in country B have an incentive to try to minimize the price spread between imports and exports, but if they make mistakes that result in a price spread between imports and exports, this is B's problem. Country B should consider joining the exchange to make it possible to allocate transfer capacity with the market splitting method, which is more efficient.

(3) Curtailment based on pro rata rationing. TSOs within a region establish a coordinated schedule for allocating NTC among several bilateral agreements on a regular basis (daily, weekly, or monthly). For example the TSOs could publish a notice saying that all parties wishing to use NTC during the month of February should submit their requests for transfer capacity in MW, on before 0800 on January 31. The TSOs estimate physical flows and find out which interfaces are constrained. If the net requirement for transfer capacity in direction A-B is 125 percent of NTC, then every request for transfer capacity A-B will be curtailed by one-fifth. Prices are simply ignored. This method is easy to understand but it is very inefficient from a pricing standpoint.

(4) Curtailment based on relative contribution to physical power flow. TSOs within a region establish a coordinated schedule for allocating NTC among several bilateral agreements on a regular basis (daily, weekly, or monthly). For example the TSOs could publish a notice saying that all parties wishing to use NTC during the month of February should submit their requests for transfer capacity in MW in a given direction, on before 0800 on January 31. The TSOs estimate physical flows and find out which interfaces are constrained. On each congested interface the highest priority is given to the bilateral transaction with the highest ratio of physical flow in MWh to contract volume in MWh. The lowest priority is given to the bilateral transaction with the lowest ratio of physical flow to contract volume in MWh. Prices are simply ignored. This method is inefficient from a pricing standpoint.

(5) Auctioning Method. The TSOs on both sides of a border agree to conduct an auction on a regular basis (daily, weekly, or monthly). Each market participant offers a price for the use of transfer capacity in one direction. The TSOs find out which direction is constrained, and give the highest priority to the highest bid. Bids for transfer capacity in the constrained direction are accepted until NTC is fully committed.

(6) Market Splitting. TSOs within a region establish a power exchange that covers the entire region including the national borders or interfaces that may be congested. The region is divided into "price areas," i.e. geographic regions, so that each price area may have its own pool price. Available Transfer Capacity (see Appendix A) is given to the power exchange. If there is no congestion then the pool prices are the same in all price areas. If there is congestion then the high price area will be the one with a surplus of demand relative to supply, and the low price area will be the one with a surplus of supply relative to demand. This approach is implemented by Nord Pool in Sweden-Norway-Finland-Denmark.

This method can be implemented even when some of the Net Transfer Capacity is reserved for long-term bilateral agreements, but the result will be inefficient if a lot of capacity is reserved to implement bilateral agreements whose prices are very different from the market-clearing prices prevailing in the power exchange.

(7) Redispatching. TSOs within a region establish a coordinated schedule for allocating NTC among bilateral agreements on a regular basis (daily, weekly, or

monthly). For example the TSOs could publish a notice saying that all parties wishing to use NTC during the month of February should submit their requests for transfer capacity in MW, on or before 0800 on January 31. Each "contract flow" request could be defined as country-to-country, zone-to-zone, or point-to-point, but the TSOs would need to forecast physical flows. All of the contract flows would be implemented, but the TSOs would issue dispatch instructions to power stations to relieve congestion, so that there would be "uncongested" dispatch instead of "contract flow" dispatch. High-cost power stations located in uncongested areas would be asked to generate additional energy. Presumably the power stations would insist on receiving compensation for this change in the dispatch order and the TSOs therefore need to raise the transmission tariffs to consumers, to pay for the more expensive dispatch order. The cost of congestion is "hidden" in the transmission tariff. Each TSO is responsible for the cost of redispatching in its own control area.

This method can be used when there is a regional power exchange, as well as bilateral agreements. On a day-ahead basis, market splitting is much better than redispatching, but on an intradaily basis redispatching may be much simpler than setting up an intradaily market. Redispatching could also be used in a region when there are two or more power exchanges, plus bilateral agreements.

(8) Cross-Border Coordinated Redispatching. This is a more sophisticated version of redispatching, in which all of the TSOs in the region cooperate to identify the "uncongested" dispatch order that minimizes the total cost of redispatching over the whole region. The TSOs would compensate each other, or else compensate generators in each others' territory. This method works best when there is very close cooperation among the TSOs.

The European Commission, ETSO and CEER favor methods (5) and (6) but they are struggling with the question how to manage congestion over the entire region represented by the EU plus Norway and Switzerland. So far the most successful approach over a large region is (6), which has been implemented in Nord Pool.

6 Advanced Methods of Allocating Net Transfer Capacity

Three other methods of allocating NTC could be considered and evaluated by the Regulator, although it may be difficult to implement them in some ERRA countries:

(1) Locational Marginal Pricing. This approach is implemented in PJM and in other energy exchanges in the United States, and it is implemented in Norway. What is required is an energy exchange over a large region, including two or more TSOs, so that the exchange arranges spot market transactions across the interface between the TSOs. The entire geographic region covered by the energy exchange is divided into a large number of nodes, or relatively small geographic areas, so that each node has its own market-clearing price in each hour. If transmission congestion exists there will be "high-priced" nodes and "low-priced" nodes. If transmission congestion is nonexistent then the market-clearing price will be the same in every node. One of the fundamental principles of LMP is that there should be no geographic cross-subsidization among electricity customers (or among producers) and no attempt to achieve a uniform tariff over the geographic region covered by the exchange. For many European countries this principle would be politically unacceptable, although LMP is a very effective way of managing transmission congestion.

(2) Coordinated auctions. This approach has been implemented on a modest scale in the Belgium/Germany/Netherlands auction[16] but has never been implemented on a large scale. What is required is to give one auction operator responsibility for all of the interfaces in a large geographic area, such that all bids are received simultaneously for all import and export requests across all of the national borders within the specified geographic area. The auction operator must find a solution that avoids "pancaking" i.e. it avoids the need for any buyer or seller to participate in more than one auction, to implement a bilateral transaction within the geographic area. The market-clearing prices are determined for all of the borders, in one auction. Research on this approach has been supported by ETSO, and a large number of technical papers have been published at www.etso-net.org .

(3) Area-to-area surcharges plus coordinated redispatching. This would be a somewhat unconventional approach to congestion management but from a technical standpoint it should not be overlooked. The basic idea is simple: the TSOs publish weekly or monthly tariffs that include area-to-area surcharges which are applied to groups of transactions between any two areas subject to transmission congestion. The geographic region covered by this pricing scheme would be divided into areas, such that there is expected to be very little congestion within each area. Then the TSOs would set prices that are intended to simulate the results of a coordinated auction. For example if there is congestion on power flows from area A to area B, and the result of an auction would be a cross-border fee of approximately 2 Euro/MWh, the TSOs would apply a 2 Euro/MWh surcharge for any transaction between a producer or exporter in A and a customer or importer in B. If the TSOs are able to make "good" estimates of the necessary surcharges then the cost of redispatching will be minimized. The idea is that a price signal should be given to the buyers and sellers that "cause" congestion, but an auction is not really necessary. This concept has not been pursued by ETSO or CEER because it is not considered to be a "market-based mechanism" because the TSOs would be given an opportunity to set "incorrect" area-to-area surcharges without regard to market conditions.

7 How to Increase Competition by Reducing the Importance of National Borders as Constraints

To pursue this objective a Regulator could take the following steps:

(1) Identify the geographic region in which Net Transfer Capacity needs to be measured and allocated. Identify the countries involved in the study.

(2) Define the voltage levels of the lines and transformers and the specific assets that are considered to be part of the *transmission network* within the study region. Identify all of the transmission system operators and transmission asset owners. Identify the dispatch centers operated by the TSOs.

(3) Ensure that the terms and conditions of licenses issued to producers, suppliers, and qualified customers allow them to freely export or import energy within the study region. For the market to be opened among a certain group of countries, the Regulators in these countries would need to ensure that license terms and conditions support a competitive regional market.

[16] See Dennis Klaar, *The B/D/NL-auctions*, presentation at the Conference on Cross-Border Tariff Mechanism and Congestion Management, Brussels, 7 May 2002. Published at www.etso-net.org . Mr. Klaar is a member of the ETSO Task Force on Network Access and Congestion Management.

(4) Collect all of the interconnection agreements and all import-export contracts that could be used to measure Notified Transmission Flow.[17] Develop an understanding of how dispatchers could implement the concept of Notified Transmission Flow.
(5) Ask the TSOs to publish indicative values of Net Transfer Capacity (on the Internet, the way ETSO does) and to calculate both NTC and Notified Transmission Flow on a day-ahead basis. In other words, ask the TSOs to calculate Available Transfer Capacity on a day-ahead basis.
(6) Propose a method of allocating Available Transfer Capacity that would be implemented by the TSOs or ISOs.
(7) Conduct public hearings or seminars with market participants to ask whether the regional electricity market is workably competitive and to identify problems with the implementation of the method of allocating Available Transfer Capacity.
(8) Investigate the possibility of taking legal action[18] to restrict the amount of Notified Transmission Flow held by one market participant, if that participant is a monopolist or has the ability to influence market prices by restricting other participants' access to cross-border transmission capacity.
(9) Try to ensure the independence of the TSO (and the TAO, if it is a separate legal entity) from any company or entity involved in generation and supply.

8 Identification of Transmission Asset Owners and Operators

Where a critical bottleneck is expected to be persistent, there should be some new investment in the high voltage network to increase the Net Transfer Capacity and thereby alleviate the problem. Where the interface between two interconnected systems is no longer functioning – for example, as a result of conflict among former Yugoslav republics – there should be some new investment to rebuild the interface to support either synchronous or asynchronous operation. Therefore it is impossible to find a solution to critical bottlenecks unless we examine the role of the *transmission asset owner* (TAO) on each side of the border, as well as the transmission system operator or independent system operator on each side of the border. In most European countries the TSO in a certain control area is also the TAO in that control area. However in some cases the vertically integrated utility does not want to give up ownership of its transmission assets, and during a transitional period of power sector restructuring the vertically integrated company is permitted to be the TAO while the TSO or ISO is a separate legal entity (for example in Belgium and in Italy). The transfer of assets to the TSO is reserved for some future phase of restructuring. In a few cases (Ireland, for example) the TAO and the TSO or ISO are two different legal entities and there is no plan to transfer asset ownership.
It is important for the energy regulatory authorities on both sides of a congested border to know who is responsible for developing plans for new interconnectors and who is responsible for building and financing those interconnectors. In general the day-to-day operation of interconnectors is the responsibility of a TSO or ISO while the construction and financing of new interconnectors is the normally responsibility of the TAO, in each

[17] Notified Transmission Flow is the portion of Net Transfer Capacity that is reserved for holders of long-term contracts and is projected to be needed to implement those contracts in a certain time period (e.g. 24 hours).

[18] If the dispute concerning an electricity or gas interconnector involves trade between EU Member States then an investigation might be conducted by the European Commission, Directorate for Competition. See http://europa.eu.int/comm/competition/index_en.html and http://europa.eu.int/pol/comp/index_en.htm .

country. In some countries the TSO or ISO is also responsible for preparing a network development plan and identifying the investments that are needed to achieve a target level of reliability as well as other policy objectives. If the two TAOs are unwilling or unable to finance the construction of a new interconnector then it may be possible for a third party to form a company specifically for the purpose of building a new interconnector.
An important aspect of restructuring is the question whether the TAO and the TSO or ISO should be affiliated with a vertically integrated company. In some countries the ownership of the TSO or ISO is clearly separated from the ownership of any company having generation assets or having a supply business. In other countries a holding company is permitted to own both generation and transmission assets (and perhaps also distribution assets) through its daughter companies. Experience shows that joint ventures for investment in cross-border transmission capacity between countries A and B are easier to form when the TSO or ISO in country A has the same degree of independence as the TSO or ISO in country B.

9 How to Promote and Encourage Investments in the Transmission Network Needed to Fix Critical Bottlenecks

To pursue this objective a Regulator could take the following steps:

(1) Set transmission fees at a level that will enable the TSO to raise capital (including long-term debt) and make investments in projects needed to remove critical bottlenecks.
(2) Identify the geographic region in which Net Transfer Capacity needs to be measured and allocated. Identify the countries participating in the regional market.
(3) Define the voltage levels of the lines and transformers that are considered to be part of the "transmission network" within the study region. Identify all of the transmission system operators and transmission asset owners. Identify the dispatch centers operated by the TSOs.
(4) Hold a workshop with TSO representatives to discuss and select the "worst-case scenarios" that should be used by TSOs for planning purposes and to implement the reliability standards for the transmission network. These scenarios may include lower-than-expected rainfall, higher-than-expected load growth, and so forth.[19]
(5) Ask the TSOs to forecast annual energy requirements and peak load and the resources available to meet them, under different scenarios, over a ten-year period. (If the regulator does not have legal authority to request such a forecast then the regulator could ask for a government decision or energy law amendment granting such authority to the regulator.)
(6) Ask the TSOs to identify critical bottlenecks and propose specific investment projects that would alleviate or remove these bottlenecks. Review this analysis and identify the projects that are well justified and are in the public interest.
(7) Issue licenses and other approvals needed by the existing TSOs, or by other companies interested in investing in interconnection facilities, to proceed with investments in the approved projects

[19] Under a worst-case scenario, critical bottlenecks become even more critical. If possible, transmission system planners need to anticipate critical bottlenecks before they develop.

10 Legal Authority of the Energy Regulator

If a critical bottleneck exists on the border between two countries and the electricity market in each country is regulated by an Energy Regulator, it is only logical to assume that the solution to the bottleneck will require some kind of cooperation between the two neighboring Regulators. However from a legal perspective this is not a simple issue, when one of the Regulators is outside the European Union or when both are outside. Strictly speaking the decision of a regulatory authority is binding only at the national level unless there exists an international treaty on free trade, or a treaty on a liberalized electricity market, which explicitly authorizes the Energy Regulators to make certain agreements needed to implement the treaty. A possible solution to this issue is to have "non-binding" agreements among Regulators, which state that compliance with the agreement is purely voluntary. However a very weak regulatory framework for cross-border trade is not going to promote the kind of investments needed to remove a critical bottleneck.
In an ERRA member country the legal authority of the Regulator may be defined by one of the following approaches:

(1) To implement national legislation in the energy sector by strictly interpreting the wording of the legislation. Under this approach the Regulator would not assume any additional authority unless explicit instructions are given by a Government decision or by amendments to the relevant legislation.
(2) To implement the precise wording of national legislation in the energy sector and also pursue the broader objectives of this legislation. Under this approach the Regulator would restrict the scope of his activity only when specific restrictions are imposed by Court decisions defining the limits of the Regulator's authority.
(3) To implement the precise wording of national legislation in the energy sector, to pursue the broader objectives of this legislation, and to implement the EU Electricity Directive. This approach would be based on the assumption that regulatory activities that are clearly required to implement the EU Electricity Directive are not prohibited.[20]
(4) To implement the precise wording of national legislation in the energy sector, to pursue the broader objectives of this legislation, and to play a role in implementing the Energy Charter Treaty and other treaties concerning trade. This approach would require close cooperation with the Ministry of Foreign Affairs to define the Regulator's role in fulfilling the country's treaty obligations.

It is suggested that in certain geographical regions of ERRA countries regulators consult with the system operators (TSOs, ISOs) in order to select the appropriate allocation methods thus supporting regional markets and regional trade.

[20] This approach could be implemented in an EU accession country, or a country in South Eastern Europe where the Government seeks to restructure electricity market in compliance with the Electricity Directive.

APPENDIX A

Glossary of Terms for Cross-Border Capacity Allocation

Term	Definition	Source of definition
Total Transfer Capacity (TTC)	The maximum feasible power exchange which can be transmitted between the systems A and B reliably and without affecting the system security.	ETSO, *NTC and ATC in the Internal Market of Electricity in Europe*
Transmission Reliability Margin (TRM)	A portion of *Total Transfer Capacity* that is reserved to cover the forecast uncertainties or tie-line power flows due to imperfect information from market players and unexpected real time events.	ETSO, *NTC and ATC in the Internal Market of Electricity in Europe*
Net Transfer Capacity (NTC)	*Total Transfer Capacity* minus *Transmission Reliability Margin*: NTC = TTC – TRM	ETSO, *NTC and ATC in the Internal Market of Electricity in Europe*
Notified Transmission Flow (NTF)	In a studied time frame, the portion of *Net Transfer Capacity* that is occupied by already accepted transfer contracts	ETSO, *NTC and ATC in the Internal Market of Electricity in Europe*
Available Transfer Capacity (ATC)	*Net Transfer Capacity* minus *Notified Transmission Flow*: ATC = NTC – NTF	ETSO, *NTC and ATC in the Internal Market of Electricity in Europe*
Transmission	The transport of electricity on the high-voltage *interconnected system* with a view to its delivery to final customers or to distributors	Directive 96/92/EC
Interconnectors	Equipment used to link electricity systems	Directive 96/92/EC
Interconnected system	A number of transmission and distribution systems linked together by means of one or more *interconnectors*	Directive 96/92/EC
System user	Any natural or legal person supplying to, or being supplied by, a transmission or distribution system	Directive 96/92/EC
Small isolated system	Any system with consumption of less than 2500 GWh in the year 1996, where less than 5 % of annual consumption is obtained through interconnection with other systems	Directive 96/92/EC

Offsetting or superimposing counterdirected flows	If over an electricity line between A and B one contract is concluded to transport e.g. 100 MW in direction A and a second contract over the same time is concluded to transport e.g. 80 MW in direction B, then only 20 MW have to be physically transported in direction A. Thus, counterdirected contractual flows can be superimposed in order to cancel each other out. Consequently, the contractual capacity of an electricity line can be significantly higher than its physical capacity.	2nd Harmonization Report on 96/92/EC
Physical load flow between neighbor countries (MW)	The balance of the physical load flows, measured at 3 and 11 a.m. (Central European Time) at the cross-frontier substations of transmission lines (>= 110 kV). In general, a unique metering point is used, in agreement between the partners.	UCTE, *Statistical Yearbook 1998* (Terminology paragraph 3.6)
Contractual net balance of exchanges (MW)	The difference between the contractual power from other countries (import) and the contractual power to other countries (export). These values include only medium-term and long-term exchange contracts with firm dispatchability of power during the high load hours. Contributions from power stations with joint operation are regarded as contractual power from other countries or to other countries. In any case of indispatchability of contractual power from other countries or to other countries, whatever the reason may be, it must not be taken into account within the contractual exchanges. The total of contractual exchanges represents the exchange balance with third countries.	UCTE, *Statistical Yearbook 1998* (Terminology paragraph 3.9)
Operating transmission line	An internal 400 kV network connection of a country, and/or an interconnected line >= 100 kV.	UCTE, *Statistical Yearbook 1998* (Terminology paragraph 4.9)
Interconnection	A connection (lines, cables and equipment, including transformers, etc.) that may be used to convey electrical energy in either direction between networks, between power stations, or between power stations and networks. An interconnection may exist within the limits of a single undertaking or among several undertakings, within one geographical area or among several geographical areas, within one country or among several countries.	UCTE, *Statistical Yearbook 1998* (Terminology paragraph 4.10)

Interconnected network	All *interconnected lines*, without regard to voltage, included within the limits of a single undertaking or among several undertakings, within one geographical area or among several geographical areas, within one country or among several countries.	UCTE, *Statistical Yearbook 1998* (Terminology paragraph 4.10)
Interconnected line	A line providing an *interconnection*.	UCTE, *Statistical Yearbook 1998* (Terminology paragraph 4.10)
Interconnected countries	Countries that are linked together by one or more *interconnections*.	UCTE, *Statistical Yearbook 1998* (Terminology paragraph 4.10)
Networks in parallel	Interconnected networks functioning in synchronism, which is the usual condition.	UCTE, *Statistical Yearbook 1998* (Terminology paragraph 4.10)

DISPUTE RESOLUTION

Discussion Paper
February, 2002

by *Chairman Thomas Welch, Maine Public Utilities Commission, Bela Gyorke Head of Consumer Protection Dept., Ilona Abraham Head of Legal Dept., Laszlo Huber Head of Gas Licensing and Supervision, Gabor Racz Deputy Head of District Heating Licensing, Daniel Vitanyi Deputy Head of Price Preparation and Analysis, Hungarian Energy Office*,

This paper outlines the mechanisms and categories of dispute resolution for the member regulatory offices of the ERRA. The paper is organized into six areas of discussion. First, what kinds of disputes are subject to the jurisdiction of the agency. Second, what kinds of processes are available to resolve the disputes. Third, what parties or other interests can participate in the process. Fourth, when is public notice provided. Fifth, what are the principles governing the decision-making process. Finally, what are the sources of legal authority.

Types of disputes

Consumer v. Supplier

Hungary

In the field of consumer protection disputes, the Office most commonly resolves consumer claims against suppliers. The Office focuses on the management, administration and resolution of this type of dispute.

Billing
Theft of service
Metering
Extension of service
Service Quality
Repair
Fraud against the consumer

Maine, USA

Where companies compete against one another, there is a temptation to mislead the customer about the quality and/or price of its own products when compared to the competition. We thus find ourselves involved in judging whether particular representations are untruthful or misleading, and in some cases we require that all companies publish certain information in the same format so that customers can compare easily.

Supplier v. Supplier

Hungary

There are no established mechanisms to manage these disputes. One of the major tasks of the future is the establishment of these mechanisms, as well as the codification of the concerning decrees and statutes.

Maine, USA

Opening our market to competition has created an entirely new category of dispute. These new disputes involve the manner in which one

participant in the market interacts with another. For example, if one participant needs a product from another, is the price and quality appropriate? Is one utility discriminating against another? Is information about customers (or marketing opportunities) being unfairly disclosed or withheld? Is the company adhering to "codes of conduct" designed to prevent discrimination?

License

Price

Hungary

The office makes a recommendation concerning price to the Ministry. he recommendation is based on the analysis made by the Office concerning costs. The Ministry makes the final decision concerning price.

Political Directives

Process

Formal administrative process

Complaint

Investigation

Discovery

Compelled production of documents

Confidentiality

Public Input Hearing

Settlement

Hungary

Maine, USA

The commission engages in many informal forms of dispute resolution. Before a particular dispute has been filed with the commission (thus starting an adjudicatory proceeding), and even after it has begun, the commission will encourage the parties to try to settle the dispute among themselves. The commission staff often will participate in these discussions, providing guidance to the parties on the kind of resolution that the commission is likely to accept, and otherwise facilitating agreement. Where the parties do reach an agreement among themselves, the commission will approve it as a settlement of the dispute if:

1. The parties involved in the negotiations represent a sufficiently broad spectrum of interests;

2. The process of the negotiations was open, i.e., no one was excluded from participating; and

The settlement does not conflict with the public interest; i.e., it does not violate any commission policy or law.

Adjudicatory Process

Maine, USA

This is a trial-type proceeding, with formal process, where the commission is allowed to consider only evidence presented by sworn witnesses and arguments presented by parties and their lawyers. The

commissioners and the advisors to the commissioners are not permitted to talk to any parties about the case outside the formal (hearing room) process. Adjudicatory proceedings are used to settle disputes between companies, or between members of the public and utilities, and to set rates and terms and conditions for particular companies

Rulemaking Process

Maine, USA

For "rulemaking," the process tends to be less formal, though there are many requirements concerning public notice, the opportunity for the public to be heard, and the manner in which the rule is developed. For example, the commission must publish a "proposed" rule, and seek comment (and hold a public hearing) before deciding on a "final" rule. In the order establishing the final rule, the commission must explain why it has adopted the particular rule, and also explain why it did not accept all of the comments made concerning the rule. The rulemaking process if more flexible than some processes, however, because the commissioners are free to communicate with anyone at any time about the rule during its development. Rulemakings are used to deal with issues that apply to everyone in the industry or industry segment; in other words, rules set policy rather than decide particular disputes about particular companies. Rules are typically used to set standards for consumer protection, form contracts, and the like; ERRA members typically use the licensing process to deal with many of the same issues.

Technical/Formal Hearing

Draft Decision

Final Decision

Letter

Hungary

Issued in consumer complaint cases

Written Decision

Rulemaking

License

Hungary

Written decision is issued. Gives reasons for decision, but does not summarize the evidence or discuss the legal principles applied.

Adjudicated case

Appeal to Court

De Novo review

Hungary

A party to a decision by the office can seek review by the court. The court has the authority to make its own determination of the facts and the application of the law. The decision of the lower court can be appealed to the court of appeals

Limited review

Maine, USA

A decision by the MPUC is appealed directly to the Maine Supreme Court. The court accepts the facts as found by the MPUC, and will give "deference" to the MPUC's decisions concerning the law. This structure is one of the reasons why the MPUC decision-making process is required by law to be open and transparent.

Public Participation and Coordination with other agencies

Civil Representation

Structure

Hungary

STRUCTURE SET BY LAW

36 GROUPS. 4-5 PARTICIPATE IN ELECTRICITY ISSUES

The Energy Interest Representing Board (EIRB) is the most important forum for preventing disputes between consumers and suppliers. The Hungarian Energy Office operates this board on the basis of the principles set forth in the Rules of Organization and Operation. The work of the Board is organized by the Office in compliance with the prescriptions defined in the "Statute" that have been approved by the Board. The body includes the consumers (representatives of the civil representation groups), the suppliers (electricity, gas, district heating), and the representatives of the Office.
The Board meets once every three month (but special meeting can be called if needed), and puts questions representing the widest range of consumer interests (price setting, technical and economic changes influencing the consumers' supply) on its agenda. The Board adopts decisions on the negotiated questions, which serve as recommendations for the current President of the Office

Maine, USA

There are a few private groups representing specific interests that appear in our disputes. These include, most often, groups representing industrial and commercial customers. We also, less often, see groups representing environmental or low income interests. The latter groups tend to have less funding, for obvious reasons, and the commission is sometimes asked to provide financial assistance to them. The statute enabling the commission to provide such funding is narrowly drafted, however, so such requests are rare. The interests of low income and other residential customers are represented by the Office of Public Advocate, a government entity funded (like the commission) by assessments against the utilities. In Maine, the office has a budget of about $1.5 million, and a staff of about 15 people. The OPA participates in virtually all of the commission's cases.

Role

Hungary

Civil Representation groups can bring complaints (consumer issues, including consumer protection issues on license)

Do not participate formally on price or cost issues

Other Public participation

Hungary

Have right under law to participate where there is a legal interest (seldom used)

Coordination with other agencies

Hungary

The Consumer Protecting Authority is legally bound by cooperation-agreements to collaborate with other consumer representation groups, therefore with the Office as well.

Maine, USA

The commission also has an informal working relationship with the State Planning Office (part of the executive branch), which provides information about energy planning and usage, and with the Department of Environmental Protection.

We also have formal working relationships with other state commissions in New England (through NECPUC) and around the country (through NARUC), and with commissioners (who are also members of NARUC). While sometimes NECPUC or NARUC act as a group (in supporting or opposing legislation, for example), their greatest benefit is in identifying areas that need attention, and providing a common base of information for all the members.

Public Notice

When is notice given

Hungary

Written decisions are public documents

Maine, USA

New cases
Hearings
Deliberations
Decisions

How is notice given

Hungary

Maine, USA

Internet
Newspapers
Press releases

Principles Governing Dispute Resolution Process

Hungary

Maine, USA

Every decision, whether involving licensing, pricing, service quality, codes of conduct, or consumer complaints, will have a variety of possible outcomes, with different interests benefited or harmed depending on the outcome. The purpose of every dispute resolution

process should be to ensure that all points of view are heard and considered, and that the process is sufficiently public to create the accurate perception that all interests have been represented and the decision has been made on the merits. *It is not enough the a decision be "correct." Every commission decision must be seen by the public as the result of a fair and open process.*

All of Maine's processes are constructed to satisfy the following principles: They must be open, transparent, timely, and consistent.

For a process to be open, it must public. This requires that those who may be affected by the decision must have adequate notice, in advance, of the commission's activities. The commission often seeks out people who may be affected to be sure that, if they wish, they can participate in the proceedings. We also try to make it as easy as possible for all interests to participate. For people who are less sophisticated, we offer our assistance in filling in the forms needed to participate, and refer people to others (for example, the Office of Public Advocate) for additional help. Where business interests are affected, we make sure that the various business associations are aware of our proceedings. We also frequently have hearings (both formal and informal) in the communities that are likely to be affected by any particular decision; and in cases that are likely to have an effect throughout the state, we will hold several hearing in different locations around the state to be sure people have a chance to state their views. During the process of developing and implementing Maine's plan for restructuring the electricity industry, the commissioners and staff met with more than 100 different groups around the state; the chairman personally spoke to, and listened to testimony from, more than 50 groups, with total attendance of several thousand people. This level of public involvement was extremely helpful in gaining public support for our decisions.

An open process also means that the public should be able to see and hear what we are doing. For that reason, we keep a written record of all hearings. We also broadcast our deliberations (where we make decisions in all cases) over the internet and "archive" the hearings so that they can be retrieved by the public at any time. All of our hearings and deliberations are open to the public, with the time and place announced in advance.

Decisions must be "transparent." This means that we state, clearly and accurately, why we have made any decision. It is important to explain not only why we adopted the positions we did, but also why we rejected other positions. The process itself also needs to be explained and understood; for that reason, our decisions describe the kind of process that led to the decision.

Decisions must be timely. There is saying among lawyers that "justice delayed is justice denied." We try to act as quickly as we can in every case, so people can get the answer they need. This is especially

important where people are trying to enter the market: they do not want to have to wait for months or years while we decide whether they will be allowed to do so, or on what terms. We generally try to tell parties when we expect to decide a case (though in many cases the legislature has given the commission a specific amount of time to decide), and to be realistic about how long it is likely to take. Some delays, of course, cannot be avoided (as where one of the parties cannot provide information quickly), but we try to push everyone -- the parties and staff as well as the commissioners -- to resolve things quickly.

Finally, decisions need to be consistent. While it is perfectly appropriate to change direction over time, or to make apparently differing decisions if different facts warrant it, the commission should seek to apply the same principles to the same facts in the same way whenever possible. Consistency is important both for public confidence and to assure investors and other market participants that they will be treated fairly and that the rules will not change once they have made their investments. It is also important that decisions be public (in fact, the Maine PUC issues press releases for its more important decisions, and all decisions are posted on the website).

Sources of Legal Authority

Hungary

The Act CLV of 1997 on Consumer Protection defines the legal and institutional system of the consumer protection responsibilities of the Office.

The tasks associated with consumer protection are administered by the Consumer Protecting Authority as its primary purpose. The Authority's responsibilities include every function that has not been assigned by any special statute to another authority. Other sources of authority are the Acts on Gas supply, and on Generation, Transmission and Supply of Electricity, that assign the function of consumer protection in this field to the Office.

The legal authority is contained in two Energy Acts – the Act XLI of 1994 on Gas Supply and the Act XLVIII of 1994 on Generation, Transmission and Supply of Electricity. The Act CX of 2001 on Electricity, that takes effect on January 1st, 2003, does not change the foregoing regulations. These Acts decree that, for the promotion of the consumers' interest, the Office will:

Resolve consumer claims relating to accounts, invoice, tariff-payment and metering;

Cooperate with the civil representation groups promoting consumers' interests;

Organize and run the reconciliation process between the civil representation groups and suppliers, and solve the remaining disputes;

- Secure the consumers' supply and control the quality of service provided to consumers.

The detailed rules associated with consumer protection are decreed in Presidential Directive. The Presidential Directive comprises the regulations of consumer protection, herein the course of inquiry of the disputes; the range of the civil representation groups cooperating with the Office, following the questions relating to the consumers' interests, enforcement of consumers' interests in the Office's procedures, and the communication with the civil representation groups.

Maine, USA

The MPUC's legal authority for dispute resolution derives from our statute (the laws relating specifically to the PUC) and the Administrative Procedure Act ("APA"), which governs all regulatory agencies. The commission has also adopted rules implementing the statutes and describing how our dispute resolution processes work.

The APA establishes two kinds of processes: Rulemaking and adjudicatory.

THE NEGATIVE EXPERIENCE

OF THE KAZAKHSTAN REGULATOR IN WORKING WITH SUBJECTS OF NATURAL MONOPOLIES IN THE AREA OF CONCESSIONS AND LEASING

Case Study

February 2002

by Mrs. Svetlana Grigorieva

Deputy Director,

Agency of the Republic of Kazakhstan for Natural Monopoly Regulation, Competition Protection and Small Business Support

Attraction of direct and portfolio investments to the country, which will allow implementation of the economic development programs, have always been one of the strategic objectives in Kazakhstan.

Kazakhstan takes the leading position in terms of attracting foreign investments per capita among CIS countries. Annual summary volume of direct foreign investments on average is on the level of 8% of GDP.

Favorable investment climate in Kazakhstan is ensured by:

- Preserving political stability and predictability;
- Maintenance of the currency stability;
- Implementation of the reform oriented policies aimed at market reforms, creation of the democratic jural state integrated in the world economy.

The success of the large-scale investment activities undertaken by the state will depend on the efficiency of the state property administration.

Institute of concession foreordains transfer of enterprises belonging to the state into exploitation for a certain period of time, including transfer of subjects of natural monopolies. The Agency of the Republic of Kazakhstan for Natural Monopoly Regulation, Competition Protection and Small Business Support (hereinafter referred to as Regulator) regulates activities of subjects of natural monopolies.

Our small experience work with subjects of natural monopolies (hereinafter - SNM) can be characterized by the following.

In June 1997, in accordance with the Concession Agreement, company “Traktebel S.A.» obtained concession for 15 years for the whole gas-transport system of the republic. The system includes four gas-main pipelines (distance of more than 9000 km.) and three underground natural gas storage facilities (cubic capacity more than 4 billion cub.). All

problems that later the Assignor (state) and Regulator faced were initially laid in the Concession Agreement.

Namely, the Concession Agreement stipulated that the company «makes» investments only provided the physical volume of transported gas is higher or on the same level as in 1996.

So it happened, that in the period from 1997 to 2000 physical volume of transported gas was lower than the level of 1996. The term related to investments became optional for "Traktebel S.A.» company. Though the main purpose of the concession was implementation of the investment program on major and current repairs of assets of the gas concession, acquisition of strategically important equipment, and construction of «Kyrgyz» by-pass.

Assets required significant investments. Main items of gas-main system were put into operation back in 60-s and 70-s, and are close to complete physical depreciation. Company "Traktebel S.A.» failed to meet almost all of its obligations related to investments.

Many articles of the Concession Agreement contradicted antimonopoly laws. One of the most serious contradictions was the fact that the Agreement stipulated that insufficient "level of payments" could serve as grounds for increasing transport tariffs. That did not motivate the Concessionaire to improve the rate of collection of payments for provided services. It has to be noted that during the period when the gas-transport system was in concession of company "Traktebel S.A.», the Regulator set the tariff level in strict compliance with the Law «On natural monopolies», i.e. the tariff was always based on real costs needed to provide services and ensure certain level of profit.

Further, according to the agreement, the concessionaire was allowed to determine independently the number of employees and conditions of work. In "chase" of reduction of costs concessionaire considerably reduced the number of production personnel. The «outflow» of qualified employees – engineers and workers – to neighboring states took place. Today the company faces a serious staffing problem, and significant funds are spent on training specialists.

A specific feature of our gas-transport system is the fact that 88% of assets of the whole system is used for domestic transportation (which comprises about 5% of the total volume of transportations). Historically, income from international transit subsidized transport tariff for domestic consumers. And there were periods when natural gas for the most remote consumers was cheaper than the price at which it was purchased in Uzbekistan.

Tariffs for international transit of natural gas are set independently by the subjects of natural monopolies on a contractual basis.

The concessionaire represented by the company "Traktebel S.A.» almost halved the tariff for transportation of Turkmen and Russian gas, thus understating considerably income of the company. After that the tariff for internal consumers was increased by 1.93 times.

After analyzing the work of the Concessionaire, the Government made a decision on returning the gas-transport system to the state.

It has to be noted that the Concession Agreement is still not terminated, the state, in the person of closed joint-stock company "KazTransGas" bought out shares of "Traktebel S.A.».

Company "KazTransGas" first of all secured increase of the tariffs for international transit by 50%; tariff for domestic consumption has been reduced by 2.5 times (for the needs of the population). Today the company is implementing an important investment program, planned for several years, using only company's own funds. At the same time, the company "KazTransGas" does not plan to increase tariffs for domestic consumers.

Institute of Leasing is broadly applied in the country. It includes: long-term rent of real estate, means of production for a certain fee, with the right of use and generation of income.

Upon expiry of the leasing contract, the property can be purchased by the lessee at residual value (in this case the right of ownership is transferred to the new owner); it allows obtaining necessary modern equipment without significant lump-sum costs. Long-term rent has good future prospects in our country.

However, in the current legal framework the Regulator has no tools to influence the level of rental fees. They are automatically included in the tariffs for services of subjects of natural monopolies, and affect the level of tariffs.

As an example. In 1997, "Enro ST Ltd." (founder), registered in the offshore zone of Cayman Islands, acquired thermoelectric system of the city of Karaganda.

Further, company "Enro ST Ltd." establishes a subsidiary "Karaganda Power" TOO and leases out acquired property complex (Karaganda Cogeneration plant-1 and Cogeneration plant -3, main heat networks) for the period of 10 years with rent in the amount of 5.2 million USD to be paid quarterly. In 1998 a credit agreement was signed with the European Bank for Reconstruction and Development on extension of a loan in the amount of 40 million USD. At that time there was no law "On Natural Monopolies" yet, and "Karaganda Power" too was entitled to borrow funds without the regulator's approval.

But the company failed to take into account the fact that being subject of the natural monopoly, it has no right to set independently "desirable" levels of tariffs. As a result, today "Karaganda Power" too and EBRD in their negotiations with the regulator permanently raise an issue on considerable increase in tariffs for services provided by the company explaining it by the need to repay the loan.

However, nobody had ever presented sound economic computations, or legal reasoning. There were even court hearings (on the claims of "Karaganda Power") the results of which were not in favor of the company. The courts recognized Regulators requirements related to development of the investment program to be reasonable.

At the same time, the company insists on the keeping the rent paid to its parent company on the level of 5.2 million USD quarterly. (While the annual budget of the company is about 53 million USD.) Inclusion of these payments requires 40 % increase of tariffs.

Services that “Karaganda Power” TOO is providing are socially important, and such boost of tariffs will drastically increase the number of non-payments and, therefore, will lead to reduction in the number of provided services.

Taking into account the rigid position of “Karaganda Power” TOO leads the problem to the deadlock, EBRD had to restructure its credit down to 18 million USD.

The Regulator, having studied its experience in working with lessees, developed a set of changes and amendments to the law «On Natural Monopolies». If the amendments are adopted, the Regulator will be entitled to coordinate leasing and rent of assets of natural monopolies and the amount rent.

Structural Comparison of ERRA Member Electricity Markets
7 April, 2003

Discussion Paper
February, 2003

Introduction

As electricity markets in the ERRA member states evolve, there is an increasing need to find a common vocabulary and model within which to describe each of those markets. Experience in the U.S. and elsewhere suggests that certain structures bring related sets of required regulatory policies if markets and consumers are to be served well by the regulatory authorities. By identifying the broad categories within which each aspect of each member's market fits, and associating potentially useful regulatory policies with each category, regulators in these emerging markets will have ready access to a catalog of tools that may be useful as their markets evolve as well as in their current situations.

Moreover, by developing a common structure within which each member country's market can be described, similarities among member states (which can provide a basis for collaborative study and problem solving) and differences (which can help identify obstacles to broader and more robust markets) may be more readily identified.

This White Paper presents a "high level" descriptive structure, and places the current market of each ERRA member country into that structure. Where plans exist within a country to move from one category to another, the plan is noted. There are two primary principles by which markets are categorized. The first is whether the market participant is controlled (in the sense of ownership exceeding 50%) by the government or by private interests. The second is whether there is separation of control among the market participants either on a horizontal axis (i.e. generation split from transmission) or vertical axis (i.e. single or multiple entities in any one market segment).

Appendix 1 to this paper contains a more detailed discussion of the overall structural elements of some of the ERRA members.

I. Public v. Private Control

Generation Sector

11 Country	% Under Private Control
Albania	0*
Bulgaria	20
Croatia	0
Czech Republic	30
Estonia	1

Georgia	25
Hungary	60*
Kazakhstan	50
Kyrgyz	1.3
Latvia	5
Lithuania	5
Moldova	0
Poland	14
Romania	1
Slovakia	10
Turkey	36*
Ukraine	8*

Albania: * Private generators with concession accounted for 0.56 % of capacity and 0.32 % of total generation in 2002 .

Hungary: * There are 18 licensed generators (within 13 power plant companies) in Hungary, 6 of them are in state ownership. These state owned power plants represents 32.5% of the capacity and above 40% of the total generation. Beyond these power plants, there are many auto producers (owned by municipalities or industrial companies). These auto-producers are not licensed producers, and have a total capacity of around 600 MW.

Turkey: * Private generators accounted for 24 % of capacity and 22 % of total generation in 2002. Auto producers (industrial companies which self generate and sell surplus electricity) accounted for around 12 % of capacity and 16 % of total generation in 2002. While these figures represent the present situation in Turkey, there are 217 license applications for new private generation (including autoproducers and autoproducer groups) that have been submitted to EMRA. With the granting of new licenses, the share of private generators is expected to increase to over 50%, with the addition of new generation expected to come into operation with the completion of Build-Operate plants that are under construction in 2003.

Ukraine: * State control prevails in the generation sector. Most of the electricity in the country is produced by 8 generating companies. It is impossible to answer the question about the share of private ownership in the generation sector with one figure, as large generating companies are joint-stock companies, and the state owns from 50% to 100% of shares in each of them. There is only one company completely under private control, its installed capacity comprises 8% from the total installed capacity in the EWM.

Where government control predominates, regulatory issues include:

Efficiency. Because government ownership may involve many factors not present in private firms, achieving optimal efficiency may be more complex and perhaps more difficult in a government owned firm.. To the extent that regulators have the obligation to ensure the efficient operation of the generation sector, government ownership may require more direct intervention in management, or the creation of incentives similar to those found in the private sector, to ensure efficient operation. A related concern is that government entities may not have sophisticated cost and accounting data available.

Tools available to regulators may also include performance benchmarks, especially using performance data from private firms; ensuring that subsidies are apparent (not hidden); using a form of incentive or performance contract regulation (to the extent permitted by authorizing legislation) linked, for example, to manager salaries or energy sale price. Cooperation between the regulator and other government agencies with oversight or influence over the government generating company is also likely to be important to ensure that the information needed to evaluate performance is available. Providing assistance in cost accounting (e.g. developing a uniform system of accounts) may also be helpful.

Countries using specific tools to address these concerns include:

Albania: The Generation Sector is controlled totally by government. Current plans call for a very small portion to be private pursuant to concessions. The ERA is seeking data on costs from the generator from time to time to increase efficiency: the KESH company must report financial performance for generation according to the reporting procedure approved by ERA.

Croatia: Generation company benchmarking study

Estonia: The largest power station, running on oil shale, accounts for some 93% of all energy produced in Estonia. EMI regulates producer prices and uses the invested capital method.

Hungary: Pursuant to the law, the HEO requires the market participants to perform their obligations consistent with the principle of minimum cost. Because the state owned generation must compete in merit order with generation under private ownership (which constitutes the majority of generation), state owned companies will not be dispatched unless they perform efficiently. Currently, the HEO sets the prices for the electricity generated, based on their costs, which must be reported (together with financial performance) annually. Beginning in 2004, the prices for generation will be not regulated by the HEO.

Lithuania: Performance benchmark using data from similar companies.

Romania: In Romania, the generation sector is almost entirely under state ownership. There are 36 generation companies (4 of them representing almost 90% of total national production). The rest are small companies, especially owned by municipalities, that provide both electricity and heat. To ensure the efficiency of this sector (the lowest price of the wholesale market), ANRE imposed by market rules the Merit Order in dispatching the output of electricity. At the same time, ANRE monitors the generators costs and set-up the prices for the electricity generated and sold on the regulated market. ANRE also prohibited cross-subsidies between electricity and heat. For this purpose, ANRE issued a methodology to split (allocate) the costs between electricity and heat. All generators must report financial performances according to the reporting procedure approved by ANRE.

Ukraine: The process for ensuring efficiency in the generation sector is described below:

Depending on the forecasted consumption, volume of export and import of electricity by the Settlement System manager State-owned company "Energorynok" (Energy

market), the optimal composition of operating energy equipment is determined from the point of view of minimal cost of producing electricity by thermal plants depending on the level necessary to meet the load curve. Nuclear power stations operate in the basic part of the load curve. Thermal power plants operate in the basic part of the curve and regulate its variable part. Hydro power plants operate in the peak part of the curve.

Electricity generators work on the basis of price bids, which are presented by them on a daily basis to the Settlement System Manager for the day ahead.

Generators – nuclear power plants submit bids for operating capacity for each generating unit. NERC sets tariffs for them.

Generators – hydro power plants submit bids for operating capacity for each power plant. They are working with tariffs set by NERC.

Generators – CHPPs submit bids for operating capacity for each power plant. NERC sets tariffs.

Generators – thermal power plants of generating companies operate on a competitive basis. On a daily basis thermal power plants submit for their generating units hourly price bids and bids for operating capacity, which reflect costs of generating electricity and possible range of regulating the load. Price bids are formed on the basis of variable costs of generating units, that include costs associated with fuel.

Generating units with lowest costs are put into operation first. The most expensive cycling generating unit of the energy system determines the system marginal price on hourly basis. Payments to thermal power plants for generated electricity are formed on the basis of the hourly marginal price of the system and hourly sales of electricity.

In addition to payments for generated electricity, additional payments are made for operating according to the power system schedule requirements; to units not dispatched to ensure reserve capacity; to generating units whose load is increased due to the power system requirements; and for phasing-in the unit. Payments are reduced for units that operate in violation of operating instructions.

Capital Attraction. To the extent that new generation is needed to meet market needs, government ownership complicates the attraction of capital. Financing through tax revenues (for example, general public funds could be used to subsidize the construction and/or operation of generation), of course, may be available, but may also be limited by political and economic considerations. To the extent that capital is needed from private sources, the ownership by government of existing generation can easily deter the entry of private capital for new generation projects because the entrants will perceive themselves to be at a disadvantage in the "regulatory marketplace," because discriminatory dispatch (or other) rules, or state aid to government owned generators, could destroy the opportunity for fair competition in the generation sector. (discriminatory dispatch rules and/or state aid to the government owned generators could destroy fair competition among generators)

While, as a practical matter, there is no way to eliminate these concerns completely, the development of uniform licensing, tariffing and interconnection standards that apply to all generation -- regardless of ownership -- may serve to reduce the concerns sufficiently to attract some private capital. Another approach is to allow private generating companies to enter long term contracts with either the (government owned) Transmission/Wholesale or Distribution/Local Supply companies, or the government owned generating company. If the contracts are perceived as durable, then the private firms may find it easier to attract capital

than the government owned firm. Unfortunately, the use of such contract may itself create barriers to other potential entrants in a liberalized market. Providing clear rules for cost recovery is also important.

Countries using specific tools to address these concerns include:

Albania : Because the transmission system and generation are economically connected, because both are state property, the ERA is trying to remove this barrier to the entry of private capital by working to prepare the legal and other relevant bases for the creation of a transmission company standing on its own, economically independent, with separate accounts. ERA is preparing new rules for approval of transmission prices, to ensure transparency and non-discrimination .

Croatia: Developing uniform licensing and tariffing on connection standards apply to all generation, pursuant to the energy laws and the Grid Code.

Hungary: Pursuant to law, the HEO provides for non-discrimination in the electricity sector, and has established the standards for licensing and connection to the networks. Power plants are permitted to have a long term power purchase agreement or bilateral contract with a supplier. If conditions are not attracting investors, and there is a need for new generation, the HEO has the right to invite tenders for new generation.

Lithuania: The problem of new generation is not pressing in Lithuania for the generation exceeds market needs about 3 times. Any legal or natural person may become an electricity producer upon being granted an authorisation which is based on conditions, set in the Law on Electricity.

Romania: ANRE does not encourage in a specific way long-term power purchase agreements. According to the market rules, the electricity produced in cogeneration units is dispatched as priority, the price being established by ANRE. The price includes all justified costs (O&M costs, interests, reasonable profits, depreciation). To encourage the infusion of private capital from privatization of existing generation capacities and new green-field capacities, ANRE intends to promote new rules that establish the conditions to conclude PPAs and that will not disturb the efficiency of the market.

Turkey: Every legal entity wishing to operate in the market is obliged to obtain licenses from the Energy Market Regulatory Authority and the evaluation of all applications are based on the same objective criteria. The new market structure envisions non-discriminatory Third Party Access to the transmission and distribution systems. Dispatch will be based on bilateral agreements between market participants and in case of a physical imbalance the bids and offers provided by market participants to the National Load Dispatch Center will form the basis of dispatch.

Ukraine: See Appendix 1 for a discussion of investment issues in Ukraine.

Competition. Introducing competition into the generation sector, where a substantial portion of the sector is under government ownership, can make the development of an

efficient market difficult. On the one hand, if government operations are inefficient, private generators should find it relatively easy to compete. On the other hand, if the government entity is perceived as a threat to remonopolize the generation business, then the private companies will be reluctant to participate and invest.

Where there is such "mixed" ownership in the generation sector, it may be especially important that the market be designed and administered by an agency committed to the development of a competitive market place, and that the government commit credibly to avoiding subsidies to the government owned firms.

Countries using specific tools to address these concerns include:

Albania . The Government has approved, and submitted to Parliament for its approval, a new law for the electricity sector, which will be reorganized to achieve a new more competitive market structure, and attract private investment. The new law is intended to achieve market transparency. Implementing these changes would be consistent with the EU Electricity Directive.

Croatia: Competition is permitted, but electricity market is today open only for customers with consumption greater than 40 GWh/year.

Estonia: Competition in the generation sector is very limited, as 93% of the market is under control of the oil shale power plant. Eelectricity market is today open only for customers with consumption greater than 40 GWh/year.

Hungary: The market opened in 2003. The eligibility level for consumers is 6,5 GWh/year. The market rules are transparent and non-discriminatory. Unfortunately, the majority of capacity are contracted by the public wholesaler under long term PPAs. Therefore, the capacity for competition is only a couple hundred MWs, so the HEO encourages the market participants to renegotiate these PPAs.

Lithuania: One of main objectives of the Law on Electricity is the development of a legal framework for a competitive electricity market and fair competition between producers and suppliers. The Law gradually opens the market, allowing customers (i.e. eligible customers) the right of regulated third party access and the right to conclude electricity supply contracts directly with the producers holding the license of electricity supply.

Romania: The market rules are transparent and non-discriminatory for all generators. The Merit Order is established a day-ahead according to the generators bids.

Turkey: The mandate of the Energy Market Regulatory Authority clearly states that competition is one of the basic principles of the new market structure and EMRA has been assigned a duty to monitor the operation of the market continuously to ensure competition, non-discrimination and transparency.

In the Turkish market, generators will be allowed to enter into bilateral contracts for selling their generation and thus enable competition among generators. Moreover, the Electricity Market Law envisages the eventual privatization of the assets of the public generation company. Due to the burden of stranded costs arising from the transition into a new regime, the state-owned wholesale company TETAŞ's high-cost purchasing obligations

will be offset by the low-cost generating assets of the state-owned generation company EUAS. As this stranded costs issue is addressed over time, EUAS's assets will be released, further facilitating competition.

Where private control predominates, regulatory issues include:

Competition. Concentration of ownership leading to market power unless profits are directly constrained. Moreover, since private companies are answerable to shareholders rather than the general public, there are likely to be incentives and opportunities to "game" any system and attempt to extract an unreasonable level of profit, especially in the short term.

Regulatory tools available to address these issues include: Incentives for new entrants (e.g. new internal generation and external, foreign generation through cross border trade), to minimize the opportunities that come with market concentration; divestitures and divisions of control (when generation company is privatized); clear and enforceable accounting rules and audit authority where prices are regulated based on cost; the development of a capacity market that prevents the exercise of market power during periods of high demand/low supply; and appropriate public disclosure requirements for companies where shares are sold to the public. Examples of measures taken in the ERRA countries include:

Hungary: The law establishes strict ownership limitations. For legally separated companies with the same owners, there is an obligation to make separate accounting, among the different activities of the horizontally and/or vertically integrated company.

Turkey: A generating company's share of the country's total installed capacity may not exceed 20%. There are similar market power limitations for wholesalers and distribution companies generating electricity.

Removal of Profits from the Jurisdiction. With government ownership, there is a strong likelihood that profits from the firm will remain in the country for reinvestment. With private ownership, however, their profits may flow to foreign owners. While this phenomenon is not in itself a problem (as capital flows worldwide), it may create political pressures to restrict foreign investment or the removal of profits. The regulator may have a role in ensuring that any rules that are passed to address this issue interfere as little as possible with the market. Examples of the treatment of this issue in the ERRA countries include:

Hungary: There are no limitations for foreign investors concerning profit repatriation or share of ownership.

Turkey: The foreign capital law of Turkey allows foreign investors full repatriation of their investments. Furthermore, the only limitation on foreign control over market activities is that their share of the entire sector should not exceed 50%. There are no limitations as to the foreign share of ownership in a company.

Pricing. The treatment of prices charged by generators in the market includes:

Albania: The prices for generation will be based on the cost. The ERA has the authority to approve wholesale prices. The retail sale price will be set after the Government sets the cap price.

Croatia: A Market Code to address these issues is under preparation.

Hungary: In 2003., the prices are regulated according to the long term PPAs, but if the generator has a surplus of capacity, the price is based on the bilateral contract negotiated with its eligible customers. Beginning in 2004 the prices will not subject to regulation.

Lithuania: The prices of electricity and reserve capacity sold by the electricity producers are not regulated and are set by bilateral agreement between contractual parties or at auction except in the cases when producers have more than 25% of the market share. Where a producer has more that a 25% share, the National Control Commission for Prices and Energy defines the price regulation mechanism with the goal of preventing the producers from abusing the dominant position in the market.

Turkey: The prices that the generators will receive will be based on the bilateral contracts they negotiate with their customers and they are not subject to regulation, as long as they act competitively, without any abuse of dominant position.

Transmission Sector

Country	% Under Private Control
Albania	0
Bulgaria	0
Croatia	0
Czech Republic	0
Estonia	0
Georgia	0
Hungary	0
Kazakhstan	0
Kyrgyz	0
Latvia	0
Lithuania	0
Moldova	0
Poland	0
Romania	0
Slovakia	0
Turkey	4*
Ukraine	0

Turkey: * This figure is based on transmission wire lengths. If the calculation is based on transformer capacity, the relevant ratio is 6%. The Electricity Market Law envisages the transfer of that capacity to the state-owned transmission company TEİAS.

Government control of transmission is virtually universal in the ERRA member states. While such control is likely to be competitively problematic to the extent that government controlled firms also participate in other sectors (as discussed below), the issues surrounding government ownership of transmission assets are principally in the areas of efficiency and investment. In this respect, the issues, and regulatory tools, are similar to those involved in government ownership of generation.

Distribution Sector

Country	% Under Private Control
Albania	0
Bulgaria	0
Croatia	0
Czech Republic	40
Estonia	10
Georgia	25
Hungary	100
Kazakhstan	20
Kyrgyz	0
Latvia	40
Lithuania	5
Moldova	60
Poland	11
Romania	0
Slovakia	0
Turkey	2*
Ukraine	*

Turkey: * This figure is based on distribution wire lengths. If the calculation is based on transformer capacity, this ratio is 1%.

Ukraine: * In Ukraine the electricity distribution is done by 27 regional energy supply companies (the share of distribution provided by small owners of distribution networks is quite insignificant). It is impossible to answer the question about the share of private ownership in the distribution sector with one figure, as regional distribution companies are joint-stock companies, and the state owns from 25% to 100% of shares in each of them. Only one of 27 companies is under private control.

Where government control predominates, issues include:

Efficiency. As with generation, there is some evidence that government owned firms may be relatively less efficient than privately distribution companies and less effective in bill collection. Government ownership is likely to require more direct intervention in management, or the creation of incentives similar to those found in the private sector, to ensure efficient operation. A related concern is that government entities may not have sophisticated cost and accounting data available. Because distribution is likely to remain a

monopoly, the regulation of one government entity by another may lead to political issues that cloud the economic and accounting issues that require attention.

Tools available to regulators may also include performance benchmarks, especially using performance data from private firms; ensuring that subsidies are apparent (not hidden); using a form of incentive or performance contract regulation (linked to manager salaries or energy sale price). Inter-agency cooperation is also likely to be important to ensure that the information needed to evaluate performance is available. Providing assistance in cost accounting (e.g. developing a uniform system of accounts) may also be helpful.

Countries using specific tools to address these concerns include:

Albania: With the beginning of reform in the Albania energy sector in 1995, three pilot distribution companies, all of which were part of KESH company (state owned), were created . They have 70% state owned capital and 30% private capital. These companies have failed, due to losses, and KESH will soon resume full control. New procedures and organizational structures are being developed during 2003. Under the new structure, each distribution company will buy its electricity supply from KESH at a price approved by ERA.

Croatia: Performance benchmarking using a comparison with EU companies. Manager salaries are linked with some performance measures.

Estonia: The largest Estonian distribution network participated in the Pan-European benchmarking of electricity distribution companies. There is no result yet.
EMI regulates the tariffs of distribution companies and sets price cap pursuant to a methodology set by EMI.

Lithuania: The Law on Electricity provides that the prices of distribution service should be regulated by setting the price caps for them – incentive regulation of natural monopoly company, because it provides a possibility to earn more profits by reducing costs. Nevertheless, companies, when reducing costs and thus seeking higher efficiency and bigger profits, have to ensure reliable operation of the electricity system, access to networks, and the quality of customer service. Performance benchmarking using the data of similar companies is also used.

Romania: ANRE imposed Performance Standard and annual reporting procedure for distribution companies. Distribution companies are also obliged to submit annual financial reports according to a procedure issued by ANRE. ANRE intends in the future to perform benchmarking approach regarding of the distribution service tariffs and indicators established in the Performance Standard.

Turkey: Companies engaged in distribution are subject to incentive regulation with performance targets set annually. The tariffs of distribution companies are regulated and they are set according to the relevant performance targets. If a company over-performs its targets, it gets to keep the extra profit. Furthermore, there will be a uniform system of accounts and regulated tariffs for distribution and retail sale to non-eligible consumers.

Ukraine: The regulatory approach to all natural monopolies (all regional energy supply companies are natural monopolies) in the sector is uniform regardless of their form of

ownership. At the same time, certain conditions are being created to attract strategic investors to the sector. For example, a tariff setting methodology has been developed for strategic investors which takes into account in the electricity transmission and supply tariffs profit per cost of block of shares and profit on production investments, which are used to reconstruct electricity networks, as well as part of commercial (above-standard) losses.

The current situation with networks both in state-owned and privatized companies requires significant funds for replacement, reconstruction and new construction.

All funds received by the company are used to implement measures aimed at reduction of losses in networks, which in the long-run would promote reduction of retail tariffs for consumers. However, at the first stage it is necessary to invest funds, as no further work would be efficient without it.

Due to the fact that tariffs include profits for the accrual basis (for the block of shares), profit on production investments, and above-standard losses, privatized companies are able to accelerate execution of their investment programs. In addition, privatized companies, in accordance with the methodology, are liable for incomplete payment for electricity, it also has to be noted, that their work in this area is more efficient, as compared to that of not privatized companies.

The Commission in Ukraine has developed a Procedure for setting or revising tariffs for licensees holding licenses for electricity transmission and supply. This Procedure stipulates that revision of tariffs for electricity transmission and/or supply is possible provided in the course of the last three months all current electricity bills were paid for completely.

In addition, the same procedure stipulates that together with approval of tariffs for electricity transmission and supply, their item by item structure (operating costs and costs from profit) will be approved. When cases of non-targeted use of funds from tariffs are identified, the Commission takes measures and exercises influence on licensees (both on privatized and state-owned ones) in accordance with the current legislation of Ukraine.

To prevent abuse by energy supply companies, the NERC exercises on-going strict control over execution of investment programs and over the treatment of costs imbedded in the electricity transmission and supply tariffs.

When private control predominates, regulatory issues include:

Pricing.

Hungary: The tariffs in the distribution sector are regulated. The length of the price regulation period is 4 years. The starting price is based on an accurate cost analysis of each company. After that, there is a price correction at the beginning of each year accounting the inflation and an incentive factor. There is also a profit limitation, and if the company exceeds this limit it is obliged to share the excess with its customers.

Lithuania: Distribution network operators calculate the prices of distribution services referring to the Methodology of the transmission and distribution services price caps calculation, approved by the National Control Commission for Prices and Energy.

II. Separation of control between and among market segments

12 Country	12.1 Separation of Sectors
Albania	G+T+D (control centralized)
Bulgaria	G G+T D
Croatia	G+T+D (control centralized)
Czech Republic	G T D
Estonia	G+T+D
Georgia	G T+D (dispatching) D
Hungary	G T D
Kazakzhstan	G+T T D G+T+D
Kyrgyz	G T D (separated control)
Latvia	G+T+D
Lithuania	G T D
Moldova	G T D
Poland	G T D
Romania	G T D
Slovakia	G T D
Turkey	G T D
Ukraine	G T D

The chart shows the degree of combination, or separation, of the three primary electricity market sectors. "G+T", for example, means that the generation and Transmission sectors share common ownership. "G T D" means that each sector has different ownership, i.e. that those who own generation do not own transmission or distribution. The discussion below highlights the issues, and possible regulatory tools, appropriate for each combination. Where there is complete separation among the sectors (i.e. "G T D"), it is unlikely that the market structure *per se* will raise regulatory issues.

Details concerning ERRA member countries include:

Hungary: These three sectors are mostly separated. The transmission company and the Paks Nuclear Power Plant have the same owner (the MVM company), and the MVM also owns the three secondary reserve gas turbine power plants. MVM is owned by the state, and the state also owns the two power plants of the Vértesi Power Plant Ltd. However, these companies are legally separated. The other companies are completely separated legally, but some power plants and distribution companies have the same owners.

Turkey: These three sectors are completely separated. Parties wishing to be engaged in more than one market activity need to establish separate legal entities. For each activity that the Law permits a legal entity to carry out simultaneously, parties should obtain separate licenses and keep separate accounts, as cross subsidies are prohibited. Distribution companies may also be engaged in generation and retail sale activities, provided that they obtain a separate license and the amount they generate does not exceed 20% of the total energy consumed in their region in a given year.

Common ownership (or control) of Generation and Transmission

Discrimination. The common ownership or control of generation and transmission raises very difficult issues for the introduction of competition into the generation sector. The primary difficulty is that the opportunities and temptations for the entity controlling transmission to discriminate in favor of its affiliated generation (and against competing generation) are enormous. It is for this reason the U.S. FERC has issued a series of orders that require complete structural and operation separation of transmission from generation. Some jurisdictions (for example, Maine in the U.S.) have gone further and required that there be no ownership or control of transmission by any firm owning generation.

Tools to address the common ownership or control issue, other than requiring full divestiture and separation, include strict structural separation rules; published and regulated Open Access Transmission Tariffs (to minimize price discrimination); tariffs for interconnection that are available to all generation; to the extent that the transmission owner controls dispatch, a "transparent" set of dispatch protocols that can be audited and provide as opportunity for discrimination as possible.

Common ownership (or control) of Generation and Distribution

Discrimination. The issues here are related, but not identical, to the issues raised by common ownership of transmission and generation. If a distribution company, with the *de facto* or *de jure* monopoly over the distribution of electricity within a geographic area, is under the same ownership or control of one of several generators seeking to sell energy in that area, the temptations and opportunities for discrimination in favor of the "affiliated" generator are very strong.

The regulatory tools to prevent such discrimination, if full divestiture is not required, are essentially the same as those discussed with respect to common ownership or control of transmission and generation.

Examples of the activities in the ERRA countries on this issue include:

Turkey: Requires accounts separation and limits the amount a distribution company with a generation license may generate in its own region and the amount it may purchase from its own generation.

Common ownership (or control) of Distribution and Transmission

This is generally the least troublesome form of common ownership or control, as both transmission and distribution are most often both fully regulated monopolies.

III. Number of entities within each market segment

The significance of the number of separate and independent companies differs among the three market segments. Transmission, for example, is generally considered to be a natural monopoly (although there is increasing interest in "merchant" transmission in some countries, including the United States) . As such, the operation of transmission systems, and the recovery of costs, is universally subject either to direct government control or full price regulation by an independent regulatory agency. So long as the entity controlling transmission

does not have an economic interest in Generation, the concentration of ownership in transmission should not create market distortions. Moreover, because coordinating transmission across a wide geographic area increases the efficiency of trading and dispatch, the reasons to create multiple (but not overlapping) systems that may exist in the Distribution sector (discussed below) do not exist. All the ERRA members have adopted a single transmission owner structure.

In Distribution, there is less need to coordinate across broad areas. Thus many jurisdictions create, or permit, several Distribution companies to coexist. Generally speaking, however, the territories of the Distribution companies do not overlap: that is, within any particular geographic area, each Distribution company is viewed as a natural monopoly. Reasons for multiple distribution companies include the ability to "benchmark" the performance of one company against the others; identifying "best practices" by allowing differences among companies in rate design and operations; and attracting investors (where there are more opportunities to purchase an interest in any one country). As with Transmission, this (local) monopoly should create no market distortions so long as the ownership and control of distribution is separated from the ownership and control of generation.

Where Generation is opened to competition, the number of separately owned and controlled firms becomes critical. If there are too few firms, or a small number of firms controls a high percentage of the available capacity, the market is likely to be exposed to a significant risk of the exercise of market power. Even in well developed markets, identifying and measuring how much concentration is "too much" remains a difficult and evolving task. In the United States, for example, there is general recognition that even traditional "concentration" tests used in antitrust (anti-monopoly) law may be inadequate, because the relationship between available capacity and load is constantly shifting: what may be an adequate number of separate firms in a low usage hour may in insufficient, in periods of high usage, to prevent the exercise of market power. In general, however, it is likely that the more firms there are, and the smaller the share each firm has of the total capacity, the better the market will perform.

In the absence of confidence that the number of firms is sufficient at all times to ensure a fully competitive market (confidence that few if any markets have produced), regulatory tools such as the mitigation of prices during periods of high demand and price caps are often employed. Other approaches include setting up capacity markets that are designed to ensure that there will always be a surplus of sufficient size to ensure good market performance. All of these methods are controversial and evolving.

Number of Firms in Each Market Segment:

Country	**G**	**T**	**D**
Albania	2*	1**	4***
Bulgaria	?	1	?
Croatia	?	1	?
Czech Republic	1	1	8
Estonia	3 + 17*	1	3
Georgia	50	1	5

Hungary	12	1	6
Kazakhstan	?	1	?
Kyrgyz	?	1	?
Latvia	?	1	?
Lithuania	11*	1	7
Moldova	?	1	?
Poland	?	1	?
Romania	36*	1	8
Slovakia	?	1	?
Turkey	34*	1+2**	8+1***
Ukraine	*	*	*

Albania: * There are two generation companies. One is KESH, with a generation capacity 1640 MW. KESH provides 100% of the generation in Albania. ESSEGEI, a company given with concession to the Italians with 9,2 Mw generation capacity, generates less than 1% of the generation in the country.
** The transmission is included in KESH, which is responsible for the generation, transmission and distribution of the electricity in Albania.
*** In addition to KESH, which has the responsibility of distribution, there are three pilot companies for the distribution that have each 70% KESH owned capital and 30% private capital. Very soon these three companies will be included in KESH.

Estonia: * 17 are hydroelectricity producers (output <0,3% of total production)

Lithuania: * Small hydro-electric power stations (around 40) are not included in the figure.

Romania: * Auto-producers (output <1% of total production)

Turkey: * This figure includes the state-owned generation company EÜAŞ, its 4 affiliates, 2 Transfer of Operating Rights companies, 3 Build-Operate company, 2 concessionary companies, 22 Build-Operate-Transfer companies. Autoproducers, with around 150 plants in operation, were not added to this figure.
** This figure includes the state-owned transmission company TEİAŞ and two private companies with concessionary transmission rights in specific zones.
*** This figure includes the state-owned distribution company TEDAŞ, its 7 affiliates and one company operating with concession rights. In the very near future, this figure will change, as there is an ongoing process of re-determination of distribution zones, according to which, new distribution companies will need to be formed.

Ukraine: * There is no joint ownership of generation and transmission. The state-owned enterprise “National Energy Company” “Ukrenergo”, which ensures centralized dispatch (operational-technological) control over the interconnected power system of Ukraine and transmission of electricity through main and interstate lines, and which was licensed to transmit electricity through main and interstate lines does not generate electricity. As for joint ownership of generation and distribution – it is quite possible. We are talking about insignificant number of distribution companies that in exceptional cases can rent CHPPs or own small hydro or wind power plants. Such exceptions should not lead to any forms of discrimination.

Appendix 1

Ukraine

In 1996 an electricity wholesale market (EWM) was established to improve competitiveness of the Ukrainian economy by providing consumers with electricity at minimal prices on the basis of competition among electricity generators and among electricity suppliers.

The electricity wholesale market is an integrated system of relations between economic entities when they purchase or sell electricity. The main legal and organization framework that defines general conditions of functioning of the existing EWM model is defined in the Constitution of Ukraine, and the Ukrainian Law "On power industry."

The EWM members are: electricity generators that have appropriate licenses; electricity suppliers that are licensed to deliver electricity at regulated tariffs; electricity suppliers that are licensed to deliver electricity at non-regulated tariffs; state-owned enterprise "Energy Market (Energorynok)" (hereinafter referred to as SE "Energorynok"), which is holding a license for wholesale delivery of electricity; state-owned enterprise "National Energy Company" "Ukrenergo", which ensures centralized dispatch (operational-technological) control over the interconnected power system of Ukraine and transmission of electricity through main and interstate lines, and which was licensed to transmit electricity through main and interstate lines.

There were two stages of privatization in Ukraine:

In 1997 - 1998 as investment obligations, blocks of shares from 20 to 45 per cent of statutory funds of nine out of 27 regional electricity supply companies were sold;

In 2001, according to the State Privatization Program approved for 2000 – 2002, through tenders, controlling blocks of shares of six more regional electricity supply companies were sold. At that stage, unlike at the first one, conditions were created for improvement of the financial-economic status of regional electricity supply companies – debts for electricity purchased in the EWM were restructured, special tariff setting methodology was implemented.

The next group of electricity supply companies is being prepared for privatization.

As for the privatization plans for the near future – privatization of not only electricity supply companies, but also privatization of electricity generating companies, with special focus on attracting efficient owners to the electricity sector.

Generation has been separated from transmission as a way to reduce the influence of any one market participant.

Investment issues:

In 2001, 2 115 billion hrivna was spent on reconstruction and construction of fixed assets in the electricity sector from all sources of financing, as compared to 1 553 billion hrivna in 2000, it exceeds by 36 per cent the volume of drawn down investments for the previous year. (Note: 1 US dollar equals 5.33 hrivna, 1 Euro equals 5.638 hrivna).

The main investments and capital investments were used for renovation of transmission facilities, reconstruction and modernization of electricity generating capacities.

In 2001, 902 MW of electricity generating facilities were reconstructed and modernized, as were 949.4 km of overhead transmission lines, 158.6 thousand kVA of transformers. These improvements cost 5718 million hrivna.

In 2001, the results of the analysis of the rate of renewal of fixed assets of enterprises that are under the control of the Ministry of Fuel and Energy of Ukraine show that the situation is slowly improving, but the situation with fixed assets is still unsatisfactory, due largely to the lack of sufficient funding. In recent years the share of budget funding in the energy sector amounts to only 1-4 per cent.

Difficult economic and financial situation of enterprises of the electricity sector dictated the need to finance projects of rehabilitation of enterprises in the power industry by attracting funds from international financial organizations – the European Bank for Reconstruction and Development, the World Bank, and foreign commercial banks.

In 2001, work related to implementation of four investment projects continued: rehabilitation of hydro power plants and system management, reconstruction of power-generating units # 4 of Starobeshevskaya and # 8 of Zmievskaya thermal power plants, rehabilitation of the heat supply system of Kiev. The total amount of foreign capital in the framework of these projects is about 493 million US dollars.

During 2002, 5.5 million US dollars was been received from the EBRD, and 16.64 million US dollars from the International Bank for Reconstruction and Development. 18.8 million Euro was used from credits of German commercial banks Kf and AKA to implement the project of reconstruction of the power generating unit # 8 of Zmievskaya TPP.

Issues for Further Study and Discussion among ERRA members

Are there particular approaches to increasing the number of generation suppliers that appear to work well? For example, if a single government owned generation supplier is being sold, should it be sold in pieces? Should the government retain any ownership interest, either in some or all of the new generation companies?

What are the most effective tools to ensure efficient operation of distribution companies? Of transmission companies?

What are the most important elements of a code of conduct to govern transactions and the flow of information between and among companies with common ownership operating in different sectors of the market? Does it make a difference if the common owner is the government?

What have investors identified as being the most important market structure elements for investing in distribution, transmission and generation?

What common elements exist among "incentive regulation" plans? What are the major differences? Are there ways to determine which elements are the most successful in achieving the objectives of the plans?

BENCHMARKING IN ERRA COUNTRIES

Report on the activity of the Benchmarking Working Group

The former monitoring working group decided in 2002 (February), that after having completed its former task, it wishes to go on working in the field of benchmarking.
In the first meeting a working plan for two year was accepted, according to which the task for the first year is to collect the theoretical experiences of areas that are blank for the group. In the second year this job will be utilised in practice. The working group started its job on a so far unfamiliar field.

I. Theory

Origin of Benchmarking
The expression „benchmarking" derives from land-surveyors. The bench-mark is a relative point for further measures. The process of measuring compared to the benchmark is called benchmarking.

Definitions

Benchmarking is the discovery and implementation of good practices. Benchmarking is a useful way of measuring performance in order to identify companies that show up with an outstanding performance probably resulted from approved methods. The real benefit of benchmarking is to understand how to attain outstanding performance and how to transplant it to other organisations in a mature way.
That is why benchmarking has to be conducted in relation with the following:

- Products and services: determine the specifics and functions required by the costumers and applied by product design and development.
- Business (corporate) procedures and activities: are the basis for developing and restructure business (corporate) procedures.
- Performance standard: as a result of the comparison among products, services and activities objectives are set and enforced in compliance with the few significant performance standards that lead the corporation.

Types of benchmarking

- **Internal** - *processes are compared within an organization, e.g., between different departments or divisions within an organisation*
    - **Advantage** - ease of collecting data

    - **Disadvantage** - lower probability of significant breakthroughs

- **Competitive (Peer) -** measures performance against peer or competitor organizations - often conducted by a third party to desensitize and sanitize competitive information
    - **Advantage** - particularly relevant to your practice
    - **Disadvantages** - more difficult to get data and lower probability of significant breakthroughs
- **Functional (Industry)** - similar to competitive benchmarking, but the group of competitors included is larger and more broad
    - **Advantage** - easier to get data and more cost effective in leading to innovations
    - **Disadvantage** - look at processes in a more general way than specifically
- **Generic (Best-in-Class)** - compares work processes to those who have truly innovative and exemplary performance: who does this activity the best?
    - **Advantage** - has the highest probability for long-term results
    - **Disadvantage** - most difficult to use

Steps to Benchmarking

- *Choose a benchmarking team* - preferably 5 people with (1) varying disciplines and backgrounds, (2) functional expertise, (3) credibility, (4) communication ability, (5) team spirit
- *Determine functions or processes to benchmark* - identify focus area and critical success factors
- *Identify variables to measure* - meaningful, repeatable, timely, economical to collect and drives the appropriate action
- *Analyze your own process* - process flow chart, gather pertinent data
- *Determine who to benchmark* - often depends upon your experience level. Develop a candidate list, reduce the list through secondary research of public data, contact the prospective partners, identify contacts.
- *Collect and process data* - surveys, phone interviews, and personal visits
- *Analyze data for results* - organize data, normalize, compare current performance, determine gaps, project performance gaps and root causes into the future, and develop best practices to narrow the gap
- *Specify improvement programs and actions* - employ strategies, form a strategic direction, develop an implementation plan, get approval

- *Implement improvements and monitor* - provide necessary funding, training and review processes

Is benchmarking a process or an activity?

Benchmarking has several definitions providing different aspects how to look at the concept.
Definition of a market leader company: Standard comparison of our products, services and methods with our tough competitors or with companies regarded as market leaders
Quality definition: Standard process to evaluate the process if it meets the customers' requirements.
Encyclopaedia definition: Standard to measure something, it indicates a position applied as a previously determined reference point.
General definition: The basis of performance targets leading to outstanding and rational performance, established by approved industrial methodologies.
10-step process: Structured way of an overview in order to identify, analyse and adopt the methods of the best of the industry or function.

Benchmarks

Benchmarks can be descriptive like a description of an approved industrial practice. They can be transformed into performance assessment, which points the effect of integration or adaptation of the practice.
Descriptive benchmarks or practices: every working process consists of input, iterative steps based on practices or methods and output. If practices are the best of the industry, they will result in an output that will fully satisfy the consumers' demands.
Quantitative benchmarks or performance standards: benchmarking assessment is the translation of benchmark practices into operation standards. Benchmarks (like costumer satisfaction: motivation and satisfaction of employees; quality and cycle-time; business success) are available whatever targets we have.

Benchmarking process

The process consisting of 10 steps is described by the chart 1.1. The 5 phases as well as the description of the certain phases are demonstrated in the chart 1.2. The 10-step process can be summarized as follows:

- **Decide what you will compare.** Define, what is the biggest potential to develop performance within the organization. This requires the identification, ordering of key working processes and the description of the process in order to analyze and compare practices.
- **Decide who will be the benchmark.** Define, which companies apply outstanding methods, which are worth adapting and applying.

- **Plan and carry out the research.** Define the circle of required data and conduct the benchmarking research. Observe the outstanding methods deriving from direct sources. Document the found best practices.
- **Define the current performance gap.** After concluding the benchmarking research and analysis, determine the measure of the deviation of the existing practices from the best ones.
- **Estimate the future performance levels.** Decide to what measure the performance gap will decrease or increase in the close future and how the organization will be affected by it.
- **Disclose the results of the benchmarking and let them accept.** Publish the results to the ones who are concerned in the interest of their acceptation and their commitment.
- **Review performance objectives.** Transform results into operational declarations describing which part of the business activity is developed by the implementation of the approved methodologies.
- **Prepare an action plan.** Prepare concrete feasibility plans, assessments, time schedules for activities to implement the approved methods in the business activity.
- **Take specific steps and keep track of development.** Carry out the plan and report about the development to the hosts of key processes and to the senior management.
- **Recalibrate benchmarks.** Continue the comparison and updating of work methods in order to be able to keep pace with changes of the industry. Define the position of the organization: where it is situated with regard to its quality objectives and the implementation of benchmarking.

- **Planning:** define what you want to compare, with what you want to compare it and collect data.
- **Analysis:** analyze performance gap and design future performance.
- **Integration:** inform the concerned parties about the results and develop new objectives.
- **Action:** act, keep track of development and recalibrate standards if required.
- **Maturity:** reach the required state.

Phase 1: Planning

The plan of benchmarking has been prepared.
Decide what to compare.

- Define the benchmark.
- Plan the analysis and carry it out.
- Collect the required data and information.
- Analyze the approved methods.

Phase 2: Analysis

The gap has been analyzed and evaluated based on the approved methods.

- Define the current performance gap.
- Plan the future performance levels.

Phase 3: Integration

- Objectives have been redefined and integrated into the planning process.
- Transfer the results of the benchmarking and gain acceptation.

Phase 4: Action

Approved practices were implemented and recalibrated periodically when it was required.

- Develop action plans.
- Act and monitor development.
- Recalibrate benchmarks.

Phase 5: Maturity

Leading role is a rational aim

- Define a time when to reach the leading position.
- Evaluate benchmarking as a continuing process.

Chart 1.1 Five phases of benchmarking

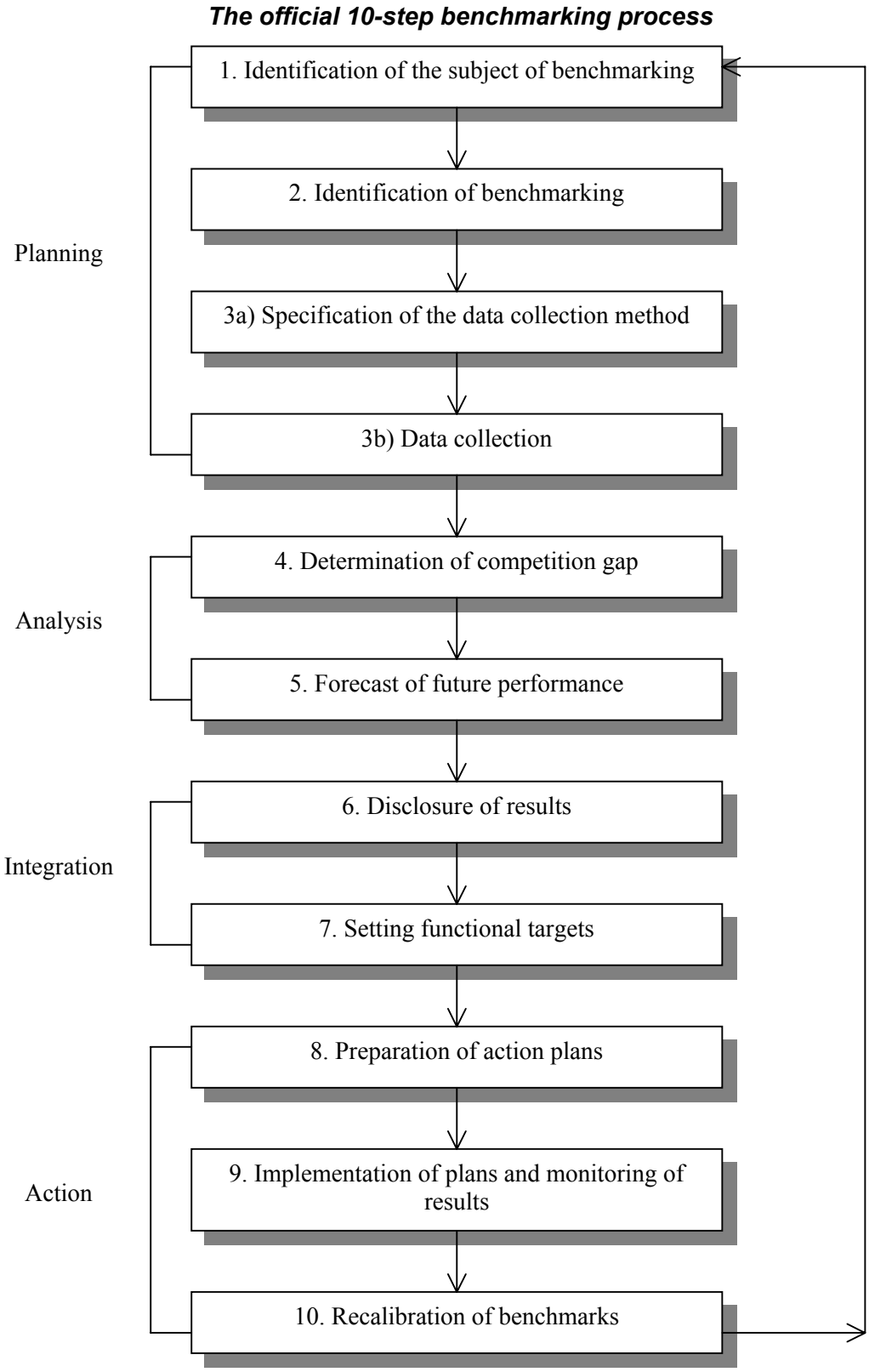


Chart 1.2 Official 10-step benchmarking process

What should you benchmark?

The initial reaction on benchmarking is usually a criticism, according to which it is purely about thinking in performance standards. Managers want to have results. They want to know, what is the benchmark, however they often forget about the process that resulted in the benchmark. There is no use of concentrating on the benchmark, without analyzing the practice - the best practice – that resulted in the performance in the given process.

Experts realized that benchmarking should focus on business activities and the development of these activities. Benchmarking activity without control will remain maximum a problem-chasing brainstorming.

At first the output of the benchmarking team has to be specified. This is generally a benchmarking research focusing on x process. Secondly the buyer/receiver of the given output has to be identified. This is often an exploratory practice, as the real buyer/receiver of the benchmarking study is not apparently the senior manager.

Where will you find the best practices?

It is useful to think over the general source of the approved practices. Look at the 3x3 matrix of the chart I.3. The horizontal axis represents the knowledge of the approved practices of the company under review. It is divided into 3 parts: known approved practices including the ones that are implemented and the ones that are not implemented, and unknown approved practices, respectively. Similar to this, the vertical axis has the same divisions but relates to another company. Now, let's go behind the four segments of the diagram.

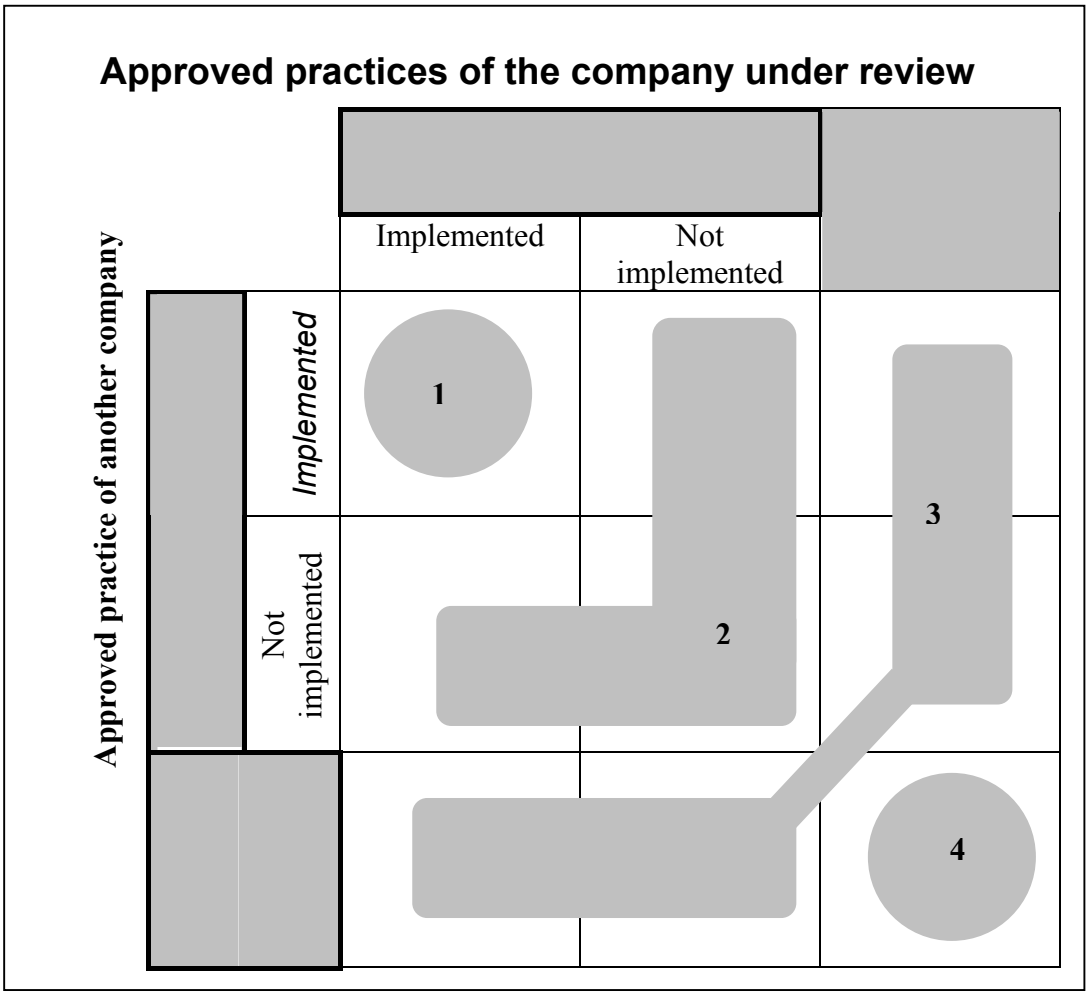


Chart I.3. Categories of the approved practices

In the *first field* the company under review is aware of the best practice and even has implemented it. The other company has done the same. The companies are in the same level. The *second field* consists of two parts. The middle part contains the known best practices that have not been implemented by the company under review and the same relates to the other company. Both companies are similar just because of their passivity. In both cases the potential competitive advantage is missing. The other part of the field No.2 – one can call it "arms" – describes the passivity of the company under review and the practices implemented by the other company. The passivity of the company under review is a serious problem: it knows better practices but does nothing to implement them for any reason.

Field 3 illustrates practices that are known by the other company but not known by the company under review and vica versa. Assumed that the other company operates in another industry, this is the case when better practices have to be looked for outside of the industry.

Finally, in the *field 4* none of the companies knows about the best practices. The substance of benchmarking is that several best practices exist but only disciplined research can determine their places. Even through someone might doubt the division of the quarters, the point is that a disciplined research is needed in order to discover best practices. This is what benchmarking is for.

Data collection

Data collection plan

According to the new approach to information research the order or research goes from the easy-access information towards the most complicated ones.

Databases – more exactly knowledge bases, as it is rather about information than data – were established basically to assure the documentation and the division of best practices and store them for the future.
They are fairly extensive and make possible the full text-search as well as reference to industry, activity and company name. Significant information storages of benchmarking are generally unique, and operate in the organization with retrieving software. As benchmarking documents are created an electronic way, they can be stored quite quickly (generally by clicking at the icon indicating the software).

External experts

Several external organizations and persons exist who provide excellent data and information, for example consultants, industrial watchdogs – financial analysts, professional associations and software providers. In the last years those articles of the functional periodicals distinguished themselves that relate to companies implementing best practices.

Analysis of performance gap

What is the gap?

The gap is the difference between the best practice and the company under review. The gap analysis is carried out on the basis of performance standards of the carefully assigned performance indices. What is missing (although more and more intends seem to appear to attain it) to trace back the gap to those business activities that were the reason of the results. This would contain the mapping of activities and comparison among activities.

After defining the gap, the aim will be to understand the difference between defining the current and the required situation and the basis of the required development. In the following steps the roots of deviations have to be found, and then motivation has to be created.

How can you recognise best practises?

THESE METHODS ARE LISTED AS FOLLOWS:

The practice is implemented by more organisations.
The practise is unambiguously excellent or top level.
The practise can be easily expressed in figures.
Benchmarkers of certain companies justify the practice.
The practice is the basic activity of the organisation.
Outputs of the practice can be offered for sale.

Management of benchmarking

The benchmarking management has to differentiate among the following activities: creation, support and maintenance of the benchmarking program.

Creation of benchmarking program

Main components of the creation of a benchmarking program are the strategy statement, setting of expectations, information of senior management, establishment of competence centre, formulating guidelines and building out the network.

Product benchmarking: for formulating guidelines supporting product design and development.
Process benchmarking: for achieving state-of-the-art working processes, which are able to satisfy consumers' demands.
Performance benchmarking: for setting rational aims and performance standards.

Benchmarking is included in the planning process in order to assure its continuity and integration in the organisation.
A benchmarking is a part of business process management in order to provide for the integration of the best practices into the processes.
Benchmarking is implemented in order to assure objectives, external comparisons and decisions based on facts.

Future of benchmarking

Due to the intensity of interest in business development and the diversity of companies and persons applying benchmarking, benchmarking is still developing. As several new techniques are developed and implemented, it might be more precise to speak about milestones of benchmarking instead of the vision of an end point.

Emerging challenges have to be solved in order to turn benchmarking into a matured regulatory tool.

An encyclopaedia or a specialist language is needed to determine benchmarking. There is still chaos around the definition, types and implementations of the benchmarking. New authors try to observe benchmarking from a different aspect in order to differentiate their brand from others. Although several opinions exist, the basic definition should be standard.

Reengineering

The way how to do it is the clarification of definitions. Reengineering means the radical reformation of business processes. The most often used definition of benchmarking is the search and adaptation of best practices.

The radical reformation of business processes is not indispensable but the search of the best practices is indispensable (does not matter if it has radical effect on business processes or has not).
This fact should be continuously strengthened together with the other concept according to which the benchmarking applied by managers is the way of attaining the required achievements.

II. Benchmarking methods

Methods

A number of different benchmarking methods exists. The regulators prefer total frontier methods
Benchmarking: Total methods, Partial methods.
Total methods: Frontier methods, Index methods
Frontier methods: Non parametric, Econometric, Stochastic, Deterministic
Non-parametric: Data Envelopment Analysis (DEA)
Index methods: Total Factor Productivity
Stochastic: Total Factor Productivity
Deterministic: Corrected Ordinary Least Squares (COLS

A chart demonstrating the above described:

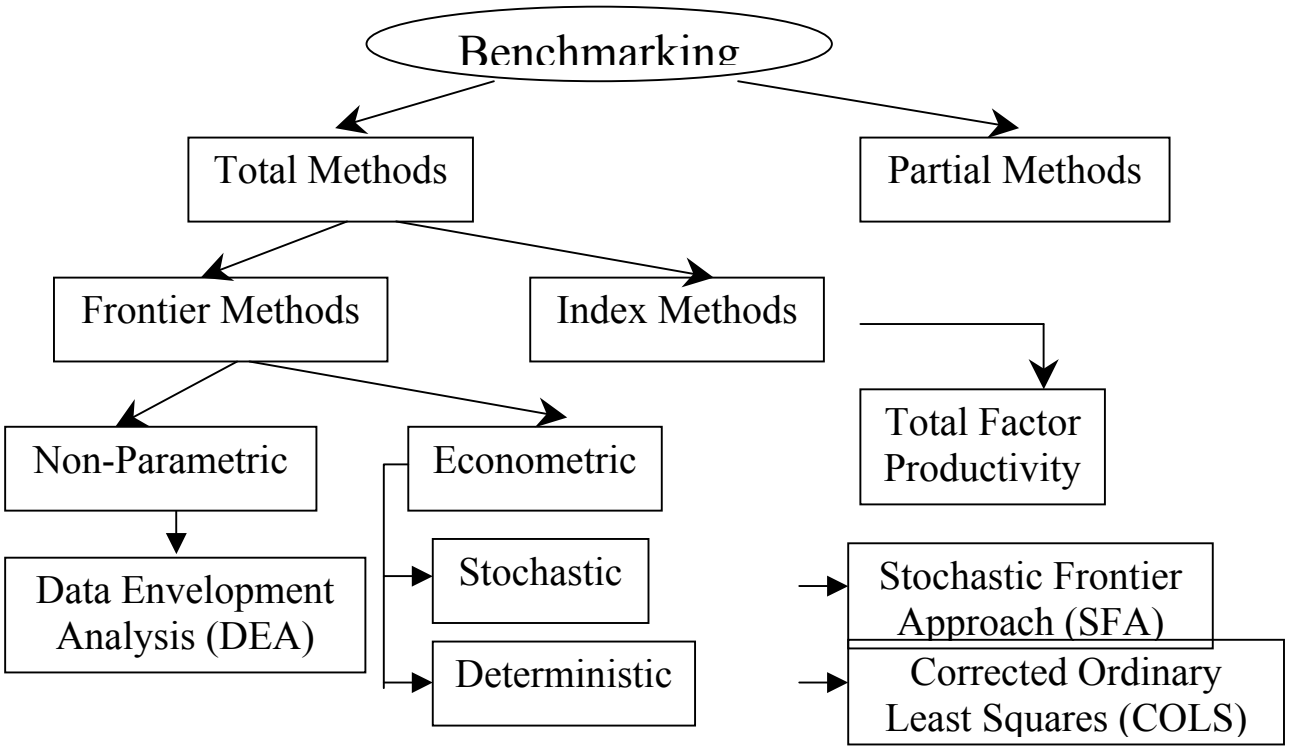


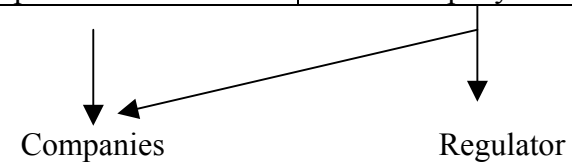
Chart II.1 Benchmarking methods

Total methods work with multiple input / output combinations while partial methods are based on simple comparisons of ratios.
Possible inputs: 1 – Labour, 2 – Services, 3 – Investments
Possible outputs: 1 – Energy, 2 – Demand, 3 – Consumers
Partial Methods: Uni-dimensional Analysis, Result: Ratios, E.g. Labour Cost / Energy Transported
Total Methods: Multi-dimensional Analysis, Result: Aggregated Efficiency Scores

Frontier methods (DEA, COLS, SFA) define efficiency frontier towards what the individual companies' performance is measured
Econometric methods use cost or production functions and regression analysis. SFA accounts for data stochastic errors.
DEA uses multi input/analysis based on linear programming.

Making choice on regulatory regime requires a number of decisions

Criteria	Micro Benchmarking	Macro Benchmarking
Number of Input/Output Factors	Uni-dimensional Analysis	Multi-dimensional Analysis
Business Activities/ Process Scrutiny	Separate assessment on business process levels	Aggregate assessment for the whole company



Benchmarking Analysis

DEA

Advantages

- Multi-dimensional method
- Establishes peer companies
- It does not require functional relationships between input and output factors
- Distinguish between pure technical and scale inefficiency

Disadvantages

- The results could be influenced by random errors, measurement errors or extreme events
- Less information about statistical significance of the results
- In case of small samples and high number of input or/and output variables – danger of over-specification of model and "made-up" results for efficiency scores
- Companies exhibiting extreme parameters will be classified as efficient

COLS

Advantages

- Allows to assess the significance of each network cost driver

Disadvantages

- No measurement of stochastic errors
- Requires large data volume in order to create robust regression relationship
- Sensitive to data quality (the company setting frontier could be an outlier)

SFA

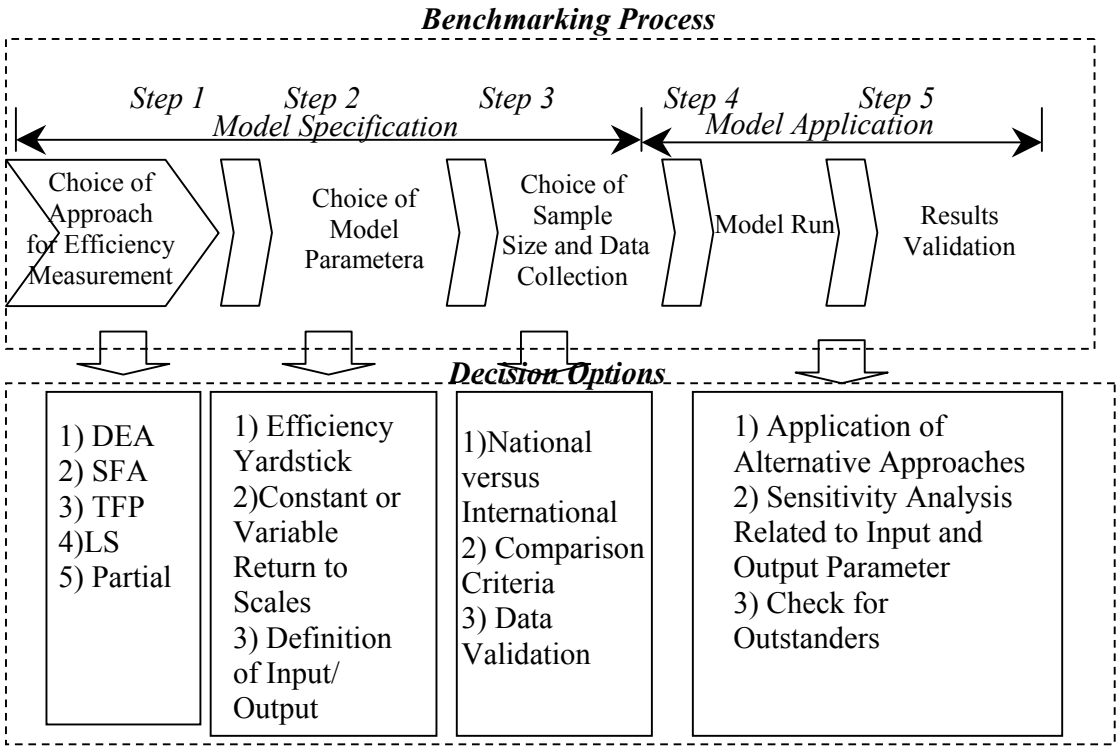
Advantages

- No sensitive to input and/or outputs as DEA / COLS

- Allows to assess the significance of each network cost driver
- Considers stochastic errors

Disadvantages
- Complex
- Requires large data volume in order to create robust regression relationship
- Real inefficiencies could be allocated to stochastic element

Steps



III. Data collection in the countries of the working group

The working group collected data with the help of questionnaires. Countries participating in the work and the data collection of the working group are listed in Annex No. 1. One part of the data related generally to the transmission and distribution networks of the country, the other part related to the difference and structure of the transmission and the distribution charges. Furthermore we analysed the tariff components, of which transmission and the distribution charges consist and we analysed the concrete prices, as well.
The questionnaire can be found in the Annex No. 2.

In the course of the survey we intended to reconstruct the benchmarking analysis of charges for system use made in the countries of the European Union.[21] The quantitative analysis used three representative example.

This three representative examples have been considered to illustrate the quantitative differences in transmission tariffs among the different countries. Three customers have been chosen with the following load profiles:

Case A
Flat consumption of 7 MW for the 8760 hours of the year.

Case B
A typical factory, consuming a constant load of 15 MW with during 16 hours (from 8 h to 24 h) in working days, and no load in weekends (approximately 4200 hours per year).

Case C
A shopping centre, with a constant load of 5 MW from Monday to Saturday 12 hours a day (from 10 h to 22 h) and no load the rest of the time (approximately 3760h per year).

The following assumptions have been made when computing the tariffs from the corresponding regulatory documents in each country.
System services and losses are included in the total value. Therefore, if these costs are not included in the transmission tariff of any country, they have been estimated and added to the existing transmission tariff value.

- All the consumers and producers studied are connected to the EHV transmission network (220 V or higher).
- All additional regulatory charges have been removed in order to take into account the same cost components in the calculation.
- The charge is broken down into: I) a fixed component ii) a capacity component and an energy component.
- In case that the charges have any geographical differentiation an average or representative value has been used.

[21] F. L. P. Montero-I. J. Pérez-Arriaga- F. J. R. Oderiz: Benchmark of electricity transmission tariffs in the countries of the internal electricity market of the European Union, (Utilities Policy 2001 December, www.elsevier.com)

The steps of tariff analysis

The analysis has been broken down into three steps, which correspond to the logical process that conceptually should be followed in order to determine the transmission tariff. (see Fig III.1.)

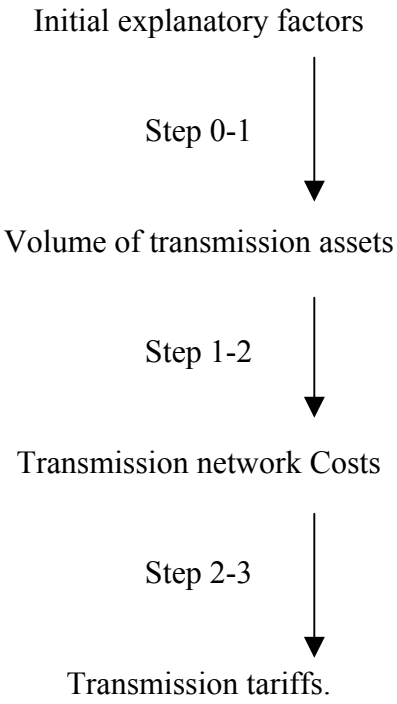


Figure III.1: Three-step approach to the explanatory analysis.

- Transmission network assets are needed to provide the transmission service in a given territory and for a specific configuration of generation and load, with a prescribed level of quality of service. The volume of physical transmission network assets is determined by a set of basic transmission driving factors or initial explanatory factors, which are represented by stage 0 in figure 1. The potential driving factors that have been considered in the analysis include the total annual consumption intensity and the volume of cross-border transits.
- A regulated revenue or transmission network cost is determined by some regulatory authority from the physical and economic characteristics of the transmission assets. It is reasonable to think that this regulated revenue is roughly linearly related to the volume of transmission assets of each country, if the same average vintage of the transmission facilities is assumed for all countries as well as similar construction and operation and maintenance costs.
- The regulated revenue is allocated to the transmission tariffs, whose main purpose is to recover the complete transmission network costs and to send correct economic signals to the network users. The average transmission network cost per MWh of consumption should also be directly related to the transmission tariff level for each country.

The results calculated for EU countries completed with Hungarian figures are demonstrated in the Attachment. (The latter calculation was made by the HEO.)

Due to the lack of data reliable results could be gained only from the first step of the analysis. The original analysis made within EU provided the following correlation:

13 Step 0-1

THREE EXPLANATORY VARIABLES HAVE BEEN DEFINED FOR THE CALCULATION OF THE NORMALIZED LENGTH OF THE TRANSMISSION NETWORK.

The following function has been resulted from these variables:

$$Length\ of\ network\ in\ km = 1{,}0038 \times A^{0{,}6722} \times C^{0{,}6136} \times (C/H)^{-0{,}2594}$$

where:
- *A:* territory of the country in km^2,
- *C:* annual electricity consumption (TWh),
- *H:* population of the country (million persons).

Correlation based on the data of the ERRA countries:

$$Length\ of\ network\ in\ km = 0{,}01 \times A^{1{,}26} \times C^{0{,}697} \times (C/H)^{-0{,}521}$$

The regression correlation fits also in the case of ERRA countries, the determination coefficient is 96%. The regression correlation is shown on the table III.1:

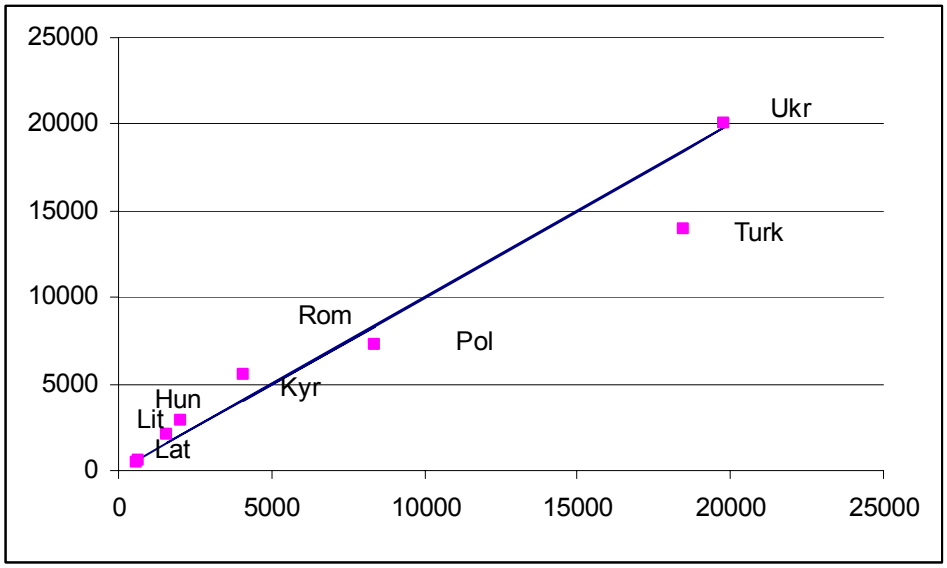


Table III.1 The regression correlation

In the course of processing data we had to face with the problem that this kind of price structure cannot be applied for every country. That is why questions had to be narrowed to distribution network and the distribution charges, respectively.
This, however, did not mean the end of problems. The available data were deficient or only partial answers arrived and we did not receive any respond to our clarifying questions.

Available data are included in Table III.2.

Country	Voltage level for transporting (transmission)	Voltage level for transporting distribution)	Total length 750	Total length 400	Total length 220	Total length 110
Poland	750,400,220		114	4660	7888	
Hungary	750,400,220	120,35,30,20,10	268	1735	1185	
Albania	400,220,110,35	20,10,6,0.4		120	1183	1240
Croatia	400,220,110	35,10,0.4		1157	1245	4762
Lithuania	330,11	35,6,0.38			1665	5022
Latvia	330,11				1248	3947
Kyrgyz Rep.	500,220,110	35,10,6,0.4	546	1364	4470	
Ukraine	800,750,500,400,330,220	154,110,35,20,10,6	4700	20000		
Turkey	380,154	35,16,11,0.4		13875	85	30000
Romania	750,400,220		154	4326	3605	

Country	Seasonality	Charge €/MWh	MV	LV
Poland	yes	2	0,5	1,2
Hungary	no	5,1	5,5	
Albania	no			
Croatia				
Lithuania	yes	9,8	12	22,9
Latvia				
Kyrgyz Rep.	yes	2		
Ukraine		1		
Turkey	no			
Romania	no	4	4	8

Table III.2
Summary of valuable data received in questionnaires

What can be the reasons for the modest result?

- We might have raised too many questions.
- It took a significant time to answer the questions.
- The questionnaire might contain data which was not available at the regulator at once or it was too complicates or time-consuming to purchase them.
- From human aspect: it might be boring to fill in another questionnaire.
- It might be an extra burden above the everyday work-load.
- We tried to analyse questions that they have not met yet.
- The employee responsible for filling in the questionnaire might not understand the correct question (language problem)

Consequences to deduct

- Questions should be short and simple.
- The questionnaire should not consist of more than one page.
- The questionnaire should consist of minimum number of questions, possibly max. 5.
- The time for filling in the questionnaire should not exceed 15 minutes.
- If we want to achieve more, we have to make the parties interested in some ways.

IV. What does the regulator have to pay attention to?

- In case of power plant; eg.; find Best plant,
  Free market has to be assured. The chance has to be given for customers to be free to buy electricity irrespectively of generators or size.
- In case of distribution company; when setting price and price structure, the price factor should be established through which players can be punished or rewarded according to the quality and the level of supply. Consumer satisfaction assessment has an outstanding importance.
- The clean competition is assured by the anti-discriminative conditions.
- Continuous monitoring of economic and financial indices is fundamentally important. These indices are included in the former publication of the monitoring working group.
- There is no recipe. Each country/regulator has to find out by itself, what it wants to benchmark.

IV.1 Some indices to pay attention to at power plants

How will you find best practice?
How will you measure success?

- Benchmark actual activities and track against previous experience
- Measure improvements in fundamental business indicators over time
  - Safety
  - Cost/kWh
  - Reliability/ availability
  - Forced outage rate
  - Financial success of asset management

Benchmarking Strategies for Regulators

Benchmarking is an important tool for quality management; benchmarking enables you to identify the best practices in other industry or service organizations-and use that information to guide your decisions. With benchmarking, you can examine the practices of others in the industry or service to find areas in which you can enhance quality and reduce costs.
But how do you actually do it? Find out... In step-by -step detail, you'll learn to uncover the practices that lead to exceptional performance-and then implement them in you own country.

How-To Guidance to Help You....

- Understand the basic principles of benchmarking. You'll learn what benchmarking is...how it fits into your country and how it has been adapted in regulator from other industries.

- Know your options for benchmarking study. You'll discover the different methods you can use…the basic steps common to all methods...how to follow the right sequence of steps.. and what tools are available to help you.

- Use benchmarking data to identify "best practices." You'll learn what data can and cannot do...basic statistical and analytical methods.. what type of measures are available...how to select the right data-base support your effort...and the best tools for data analysis.

- Move step-by step through a sample benchmarking study. You'll find out the basic steps in performing a generic study...how to tabulate results.. and how to manage benchmarking efforts.

- Make sure your benchmarking efforts stay within legal and ethical boundaries. You'll learn the regulations that govern benchmarking.. what role your legal department should play...how to develop a benchmarking policy...how to write a participation agreement...and the benchmarking code of conduct.

- Find out about the government programs that promote benchmarking.

- Uncover new resources to help you in the benchmarking process. You'll find out where you can order the best benchmarking tools around...performance indicators, severity, risk, and outcome-adjusted data, financial and operating data, information on customer protection, service quality, quality improvement systems, etc.

V. SUMMARY

Regulators need target-orientated, rapid and continuous learning in order to keep pace with licensees and this excellence can be attained by the reliable implementation of benchmarking.
As a summary:

- Benchmarking is fundamental instrument for efficiency assessment and establishment of productivity improvement targets
- Regulators usually use total (macro) frontier methods for benchmarking efficiency of network companies and apply DEA, COLS, SFA and TFP
- There are no common consensus between regulators which methodology in the better one
- Data quality is fundamental for the successful and reliable outcome

CAN ANYONE AFFORD NOT TO BENCHMARK?

Annex 1

Countries participating in the Working Group

Albania
Bulgaria
Georgia
Hungary
Kyrgyz Republic
Latvia
Lithuania
Moldova
Romania
Turkey
Poland till December 2002
Ukraine

Annex 2

The following questionnaire was sent to the participating countries

14 CEER Questionnaire

1. **What are the rated voltage levels of the national networks for transporting electricity?**

2. **How is transmission (opposed to distribution) defined, and what assets are included in the transmission grid (voltage levels of lines, functional criteria or geographical context to define transmission within the electricity transport grids)?**

3. WHAT IS THE TOTAL LENGTH OF TRANSMISSION LINES (DIVIDED BY VOLTAGE LEVELS)?

4. SHARE OF THE TRANSMISSION GRID IN THE TOTAL ELECTRICITY TRANSPORT NETWORK (IN TERMS OF LENGTH OF LINES)?

5. WHICH SUBSTATIONS ARE INCLUDED IN THE TRANSMISSION GRID IN TERMS OF SUBSTATIONS?

6. STRUCTURE OF CHARGES APPLICABLE TO WHEELING OF ELECTRICITY

7. WHAT IS THE BASIS FOR WHEELING CHARGES?

8. IS THERE A TIME-OF-DAY/SEASONAL DIFFERENTIATION OF CHARGES?

9. WHAT IS THE AVERAGE LEVEL OF CHARGES, IN EURO/KWH FOR WHEELING ELECTRICITY ON THE HV NETWORK?

10. WHAT IS THE ADDITIONAL CHARGE IF THE SINK IS CONNECTED AT MV LEVEL?

11. WHAT IS THE ADDITIONAL CHARGE IF THE SINK IS CONNECTED AT LV LEVEL?

12. WHAT IS THE ROLE OF THE REGULATOR?

13. HOW ARE THE TRANSMISSION TARIFFS REGULATED?

14. WHAT ARE THE GOALS AND THE CONSTRAINTS RELEVANT TO TRANSMISSION TARIFFICATION?

15. WHAT ARE THE MAIN ELEMENTS OF THE METHODOLOGY FOR SETTING THE LEVEL OF TRANSMISSION TARIFFS AND FOR UPDATING THEM?

ETSO QUESTIONNAIRE

THE QUESTIONS THAT WERE NOT INCLUDED IN THE CEER QUESTIONNAIRE ARE THE FOLLOWING ONES:

1. THE TRANSMISSION SERVICES RENUMERATION COMPONENTS:

1.1. STRUCTURE OF THE TRANSMISSION TARIFF:.

1.2. HOW ARE LOSSES TREATED:

1.3. SYSTEM SERVICES:.

1.4. CONGESTION COSTS (HOW ARE CONGESTIONS SOLVED):

PRACTICAL EXAMPLES

It is requested to provide the numerical value of the annual transmission charge that must be applied, according to the existing regulation, in each one of the case examples that are defined below. The transmission charges must be provided according to the following instructions:

- Include system services and losses in the total value. Therefore, if these costs are not included in the transmission tariff, they should be added to the existing transmission tariff value.
- Assume that all the consumers and producers described below are connected to the EHV transmission network (220 kV or higher).
- Break down the charge into: a) a fixed component (€/year), b) a capacity component (€/kW/year) and c) an energy component (€/MWh).
- In case that the charges have any geographical (locational) differentiation, provide the charge for: a) the

most expensive zone; b) the least expensive zone; c) a typical intermediate value.

- In case of existence of some kind of distance related charges, provide the tariff for:

- A consumer/generator buying/selling electricity from/to a distance of 30 km.

- A consumer/generator buying/selling electricity from/to a distance of 400 km.

Three kinds of customers have been defined. These customers have different load profiles, as specified below. Also provide the transmission tariff for a generator that follows exactly these three load profiles.

Case A
Flat consumption of 7 MW for the 8760 hours of the year.

Case B
A typical factory, consuming a constant load of 15 MW with during 16 hours (from 8 h to 24 h) in working days, and no load in weekends (approximately 4200 hours per year).

Case C
A shopping center, with a constant load of 5 MW from Monday to Saturday 12 hours a day (from 10 h to 22 h) and no load the rest of the time (approximately 3760h per year).

ADDITIONAL QUESTIONS

1. Give the total annual costs (€/year) of the transmission network that has been used to compute the transmission tariffs.

2. Indicate which ones of the following cost components have been included in the determination of the total transmission costs from which the "transmission tariffs"that you have applied in the preceding case examples were obtained:

- Fixed (infrastructure) costs.

- Operation and maintenance costs of the transmission network.

- System Operator costs.

- Overhead (administrative) costs.

- Losses.

- Ancillary Services.

- Congestion Management.

- OTHER COSTS. SPECIFY.

3. Most of the transmission costs are fixed infrastructure costs. Indicate the method that is used to determine the fixed infrastructure costs of electricity transmission:

- Amortization and remuneration of the net assets: equity and debt remuneration, according to book values.
- Replacement cost of the transmission assets.
- Historical cost of transmission assets.
- Standarized transmission costs.
- Other method. Specify.

4. Which is the typical total cost (€) of the following elements of the transmission network?

- 1 km of 400 kV line
- 1 km of 220 kV line
- 1 km of 132 kV and 66 kV lines (if they belong to the transmission network).
- 1 MVA of transformation EHV/HV

5.. Is there any particular reason why the actual infrastructure costs of transmission in your country might be higher or lower than in other countries?
How significant could this effect be?

- Too fast or too slow rate of depreciation.
- Ad hoc evaluation of assets in a privatization or an unbundling process.
- A large productivity reduction factor (X in the method RPI-X) has been applied by the regulator.
- Other reason. Specify.

6. Do you consider that there is a significant geographical unbalance between production and consumption in your bulk power system? Would you qualify it as a non-significant, significant, very significant? Assume if possible that the unbalance reduces to a single exporting area and a single importing area under peak load conditions of your system. Could you provide a quantitative estimate of the amount of flow that must transit and the average distance?

7. Does the "transmission tariff" or "network access charge" that you applied in the preceding case

examples contain any other cost components that are not directly associated to the transmission network? Which ones?

- Stranded costs of generation.
- Costs of promoting renewable energy sources for generation of electricity.
- Social tariffs.
- **Any other public service obligations. Specify.**

8. . If the answer to the preceding question is affirmative, please indicate the average or typical quantitative importance of these components with respect to the total "transmission tariff" or "network access charge":

- Less than 1 % of the total transmission tariff.
- Between 1 and 5 % of the total transmission tariff.
- Between 5 and 10 % of the total transmission tariff.
- Between 10 and 20% of the total transmission tariff.
- Between 20 and 50 % of the total transmission tariff.
- More than 50% of the total transmission tariff.

9. Is the remuneration of the transmission activity linked in any way to the quality of service provided by the transmission network? Is there any target limit being set for transmission network availability? Could you indicate any measure of the present availability of the transmission network?

10. Are the transmission tariffs set in such a way that they would recover the totality of transmission network costs? Is this correspondence explicit and transparent? Is this verified? When answering this question, both the transmission explicit charges in the network access charges for eligible customers and the transmission implicit charges in the integral tariffs of non-eligible consumers have to be considered.

11. .Is there a policy of charging a larger fraction of transmission costs to the implicit transmission tariffs for non-eligible customers and a smaller fraction to the explicit transmission tariffs for eligible customers? Is the opposite true?

12. Provide an estimate of the percentage of total transmission costs that are recovered by direct connection charges.

13. Indicate any other factor, not included in the previous questions (or the questionnaire of CEER), that you consider is relevant to understand the transmission tariffs that are applied in your system.

ADDITIONAL QUESTIONS ABOUT DISTRIBUTION

1. Indicate the size (in % of the total distributed load) of the largest distribution company in your country. Indicate the aggregated size (in % of the total distributed load) of the three largest distribution companies of your country. How many distribution companies distribute more than 3% of the total load in your country? How many distribution companies operate in your country?

2. Is the same tariff applied for the whole country? If not, is there the same tariff structure for all the different distribution zones?

3. Describe the structure of your network access tariff at distribution level. If there is no common structure, use the one of the largest distribution company. Explain the following features:

- Time differentiation: indicate if there are different tariffs for different time periods. Which are these time periods?
- Capacity charge (€/kW). Time differentiation? Concept to which the capacity charge is applied (contracted capacity, coincidental peak load, individual peak load, etc)
- Energy charge (€/kWh). Time differentiation?
- Fixed charge (€/year) Indicate to which concept this charge is applied.
- Losses. How are they taken into account in the network access tariff?

4. For the following base cases:

Case A
A consumer with flat consumption of 7 MW for the 8760 hours of the year,

Case B
A typical factory, consuming a constant load of 15 MW during 16 hours (from 8 h to 24 h) on working days, and no load on weekends (approximately 4200 hours per year),

Case C
A shopping center, with a constant load of 5 MW from Monday to Saturday 12 hours a day (from 10 h to 22 h) and no load during the rest of the time (approximately 3760h per year),

answer the following questions:

- Provide the total (including both transmission and distribution levels) access tariff for consumption, differentiating the answer for the voltage levels in your country that are closest to the following values:

- 110 kV for base cases a and b

- 50 kV for base cases b and c

- 15 kV for base cases b and c

In order to be able to compare all tariffs, make sure that system services and losses are included in the tariff, even if you charge them separately. If for some reason this is not possible for you, please indicate so.

Indicate the exact voltage values for the tariff provided.

- Now, exclude from the total access tariff any kind of regulatory charges that are not related to transmission and distribution.

- Break down the charge obtained in the last bullet into:

- fixed component

- capacity component

- energy component

If the tariff is not unique for the whole country, provide the answer for the most expensive tariff and the least expensive tariff of the distribution companies that distribute more than 3% of the total load.